

Concord: Sabotage

Chris Mason

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By Chris Mason

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Tough

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One Hundred Light Years of Solitude

Emma Fuji clung to the outside of a spaceship larger than Pluto, so large that it was more like lying on an endless metallic plain, except that if she pushed off she would drift away and float through the black sky forever.

The only light she could see came from her helmet, illuminating a sharp-edged circle of the shockingly violet surface, almost smooth except for the small recessed ring into which she had shoved one gloved hand. That handhold may have saved her life. Above her there were no stars, no galaxies, only empty space. Sometimes, out of the corner of her eye, she could see a dim light several kilometers away on the surface of the ship; a navigation light, perhaps? She wasn't sure. She had only seen the outside of the ship once, almost two years ago, from the shuttle that had delivered her.

It was difficult to believe that she was moving at a good fraction of the speed of light. There was no wind, of course, no apparent motion, no background against which to gauge the progress of this immense ship and the small, helpless woman clinging to its skin.

She was feeling a little light-headed. She called up her circlet's time display. She'd been outside for over three hours. It felt like half her life.

"I'm going to die out here," she muttered to herself.

"No, you're not," said a soothing voice inside her head. "Tell me about Moondog."

A Most Unusual Morning

"That's weird," Emma said. Moondog looked up at her briefly from the floor, then put her head back on her paws.

She twitched Seeüwit. Ze answered after a few seconds.

"Emma, good morning." Zis voice was like a sweet melody, rising and falling.

"I just got a really weird message. You should see this."

"Send it to me."

She reread it again while waiting for Seeüwit to respond.

Good morning, Emma my sweet. I've left a surprise for you, but you must experience an adventure to find it. This may seem strange, but trust me, it will be worth the effort. Go outside the ship to the coordinates shown below. The package is tethered to a handhold, and it will start blinking when you get within a kilometer so you'll be able to find it. It probably won't survive reentry translation, so don't wait too long. You won't get the full experience unless you go alone, but bring a friend if you feel you must. When you've seen your present, you will know it was worth it, and you will know what to do next. I will expect suitable thanks.

There was no signature, just polar coordinates for a spot somewhere on the northern hemisphere of the ship.

"I think we'd better discuss this in person," Seeüwit said. "Meet me in the usual place."

"Okay. Be there as soon as I can."

She took Moondog outside and told her to pee, then let her back into the cottage. "Be good," she said. Moondog trotted into the living room and curled up on her bed. She seemed to be asleep before Emma could close the door.

The nearest portal was about five minutes' walk from her cottage. Emma set out on the path through the woods, enjoying the crisp air and the sunshine darting through leaves that were just starting to take

on their fall colors. The ground was still a little damp from last night's scheduled rain. A songbird, probably a thrush, warbled nearby, and she could hear a woodpecker's steady thwacking in the distance.

The ground rose up slowly, the trees thinning out, until she reached a rocky outcrop, great boulders—some larger than her cottage—forming a broken cliff face. The path led between the first of the fallen rocks, into an open space surrounded by granite walls. She walked into a tall crack in the stone without having to stoop and pressed the button for the transport.

Seconds later the rock wall slid aside and she stepped into a spotless, well-lit elevator car big enough to hold fifty people. She sat on the bench that ran all around the perimeter and said, "Lounge 751." The door closed and the car sank smoothly.

Her rendezvous point was over sixty kilometers down, on deck three, and a quarter of the way around the ship—roughly two thousand kilometers. The trip took less than fifteen minutes. The transport opened and she stepped out.

The contrast from her home was dramatic. This was not living space—at least not this part of deck three—it was a work area. Although the sky was the same thirty-three kilometers above her, the illumination was indirect and constant everywhere, with no attempt to simulate a sun or a day/night cycle, as in the habitats. The transport portal she'd just left was a stark, enormous pillar that reached all the way to the sky like a god's pencil looming overhead, composed of silvery aphrosine like the floors and the ship's outer walls, not camouflaged like the one in her habitat.

She passed buildings, some tall and some squat, all built from the same type of stone, mottled green and blue like alien granite, which it probably was. There were open areas as well, but no vegetation. It was too difficult to find plants that all the resident Tribes could tolerate, esthetically or biologically, and the constant light was also a problem, so the builders had stuck to inorganic materials.

Ten minutes from the portal she reached the single-story building that was the lounge where she and Seeüwit usually met for the interviews, and sometimes for unrecorded conversations as well. Ze was waiting for her in the single-room interior, squatting on three legs on the floor. Thweetts didn't use chairs; they didn't need them.

Ze rose to greet her and they went to their favorite corner, near the refreshment center, where there was a Human couch (stuffed, enormous, deep royal blue) that Emma was fond of and a good open space for ze to sit.

Seeüwit was a Thweett, one of an ancient single-sexed Tribe that had been Members of Concord for geological ages. In biped mode, ze stood half again as tall as Emma, but in quadruped mode ze was quite a bit shorter. Zis head was six-sided when seen from above, with alternate segments sporting a single large eye above gill-like chemical sensors, each eye separated by an even larger tympanum. Zis whole body was covered with small, loose, flaky plates called tsheef, like something between a scale and a feather, that were every color of the rainbow. A fifth limb jutted from zis back, tucked in as usual except when it was used as a hand in quadruped mode or a foot in triped mode.

"I like your word 'weird,'" Seeüwit said after they were settled. Thweetts were one of the few Concord Tribes that could be bothered to learn Napian; most just relied on their twitchers for translations. "Fizzy connotations and good etymology. And that *was* a weird message. Do you think Nicolás sent it?"

"I don't see who else it could have been. No one else calls me 'my sweet.' And *Periwinkle* left only two days ago; he must have set a timer to deliver it. But why would he hide a surprise on the *outside* of the ship? It's not like there aren't enough hiding places *inside*! My habitat is bigger than Wales, the ship has more usable space than Australia, and that's not including the engineering spaces, which—I'd like to remind you—you promised you would show me someday."

"Hmm. Wales and Australia. Just a moment."

She waited while ze looked them up on zis twitcher, which unlike the circlet on her head was a torc around zis long neck.

"Hmm," ze said again. "*Do* you want to experience this adventure?"

“Ah... I don't know. Do you think I should?”

“Should? I couldn't say.”

Ze sat in silence for a long time. Emma realized after a moment that this was a lesson; she spent some time pondering the message, then thinking through what would be involved in going outside the ship.

“This is a low-matter universe, I believe,” she said at last.

“Yes. The nearest hydrogen atom that we didn't bring with us is probably a hundred light years away.”

“Is it safe to go outside?”

“Far, far safer than it would be in our home universe.”

“No x-rays, no wormholes, no warped dimensions?”

“There is nothing in this universe,” Seeüwit said, “energetic enough to generate even one x-ray photon.”

She waited. And waited. “You didn't say anything about wormholes or warped dimensions.”

Ze ruffled zis tsheef in a wave pattern that she had learned meant amusement mixed with mild irritation. “It was my understanding that you studied poiology at your university. Therefore you know that wormholes do not exist in 3+1 universes, and warped dimensions exist at every point in spacetime and are therefore not a threat. Are you seeking a teddy bear moment?”

“I do think I need a hug from Moondog.”

“We can stop at your habitat on the way to the fabricator, if that will really make you feel better.”

* * *

They didn't, of course, because it was in the opposite direction from the airlock closest to the rendezvous coordinates.

Their ship, *Violet*, was an Enforcer class, the largest, fastest, and most heavily-armed ships that Concord manufactured. Concord was the all-embracing galactic civilization in the Milky Way, and usually it lived up to its name, but it hadn't lasted as long as it had by being passive or naive. Occasionally violence—or merely the threat of it—was necessary, and the Enforcers were the instrument of that necessity.

But the nature of their work limited the tools at hand. *Violet* had innumerable shuttles, some small and some very large, but none of them had airlocks or external manipulators, so she would have to go outside in a spacesuit.

“There's a downside to having really reliable technology,” she said when the transport was getting close to their destination.

“Really? I always thought the reverse.”

“That's because you're not young. We—I mean Humans—are used to building things that break, so we plan for redundancies and general-purpose tools.”

“An example?”

“Um... The crescent wrench. If you don't know what size nut you'll be working with, it can adjust to any size.”

“Why are your nuts different sizes? Why not just have one?”

She stared at zim for a moment. “I just mean to say that it would be nice if we had a shuttle I could fly out there instead of having to wear a spacesuit.”

“Are you nervous?”

“No.” Of course she was nervous. She'd never done anything remotely like this in her life.

“Well, *Violet* is over a billion years old and no one has ever needed such a thing before.”

“That's what I mean. Too reliable. Put it on your list, okay?”

“Okay.”

The transport took them right to a large bay with an airlock. The outside door was wide enough for ten people to walk abreast, but the bay was even larger, a flattened sphere perhaps twenty times wider than the lock. There was a fabricator outlet near the transport station.

“Emma Fuji,” she said to the interface.

“Good morning, Emma,” it said in perfect Napian. “I understand you need a spacesuit today.”

“Yes.”

“You will want a maneuvering pack. How long do you expect to be outside?”

“An hour, I guess.”

“I’ll provide two days of air and water as a safety margin. In case of emergency, waste elimination will be handled without plumbing.”

“What?”

“Ah,” Seeüwit said. “I think it means, just pee in your suit and it will clean it up.”

“Oh. Well, I hope that won’t be necessary. I think I’ll need a headlamp too.”

“Of course. I’ve never built a suit for a Human before, but I have a few hundred designs for past humanoid Members. One moment.” There was a barely noticeable pause. “Design complete. I already have your body specifications. What color would you like it to be?”

“Forest green.”

“Construction commencing.”

While they waited, Emma studied the interface panel. It was essentially just a comprehensive set of input/output devices in an alcove: camera, speaker, hologram projector, chemical generators and sensors, and so on.

“Is Nexus running this thing?” she said.

“No,” Seeüwit said, “the fabricator is a separate system.”

“But all fabricators in the ship are networked?”

“Yes, it’s all one system.”

“Your suit is ready,” the fabricator said. A small door opened beside the interface. Inside was what looked like a folded-up wetsuit, a polygonal helmet transparent except on the back, and a hard-sided backpack.

Emma took out the suit and held it up. It was obviously intended to be worn against the skin. She tied up her hair and started taking off her clothes. She smiled when she noticed that Seeüwit had politely turned away.

“You don’t need to do that,” she said. “*You’re* not wearing anything.”

“I don’t need to. My body is covered in tsheef.” The pinky-nail-sized feathery plates covered zis entire body except for the sense organs and joints. “Whereas Humans are born naked and spend the rest of their lives trying to cover up.”

“I appreciate the thought, but I’m not bashful.”

“Hmm. Bashful. Interesting concept.”

The suit was slit all the way down the side; she stepped into it, expecting it to be hard to pull on, but it slid easily onto her body and hugged her smoothly, without creases, as if it were a second skin. The feet were thin-soled boots and the hands even thinner gloves. There were thick pads on her thighs, shins, and upper arms, which she assumed, along with the thicker back of the helmet, were the suit’s computer, environmental control, and compressed air and water.

When she had all her limbs inside she ran a finger down the seam and it vanished. She flexed her hands and picked up the helmet. She could feel the ridges on the helmet through her gloves, as if her hands were bare.

The helmet sealed itself to the suit. Seeüwit lifted the backpack and helped her fasten it at chest and crotch. It was a little heavy, perhaps twenty kilos.

“The suit will do all the maneuvering for you,” Seeüwit said over her twitcher. She couldn’t hear his voice through the helmet at all. “It already knows where to go. And the environment will adjust automatically. Just go out and get the silly thing and bring it back, and we’ll do an interview about it.”

“I assume you’ve been recording.”

“Since you arrived at the lounge.”

“Okay, I think I’m ready. Suit, status?”

“Ready for space,” a quiet voice said in her ear.

Emma walked over to the airlock and twitched it to open. The door raised straight up. She walked into the brightly-lit, silvery room and turned back to Seeüwit.

“I’ll be back soon,” she said, and gave him a wave. The door closed down again.

“Evacuating atmosphere,” the suit said.

She didn’t feel or see any difference. The suit conformed to her skin so perfectly that the stiffening she had half-expected didn’t happen.

“The airlock is in vacuum,” the suit said. “Ready to open exterior door.”

“Go ahead,” Emma said, and the exterior door, much thicker than the inside one, receded from her and then pulled up and out of the way.

* * *

Although she knew intellectually what to expect, the utter darkness still shocked her. Concord ships chose very low-mass universes to travel through, side-stepping light’s speed limit by translating to another, much smaller universe, traveling at a fraction of light speed, and translating back. Because all the bubble universes they could reach had been created at the same time, they could all be mapped to each other point-to-point. Therefore traveling at a tenth of lightspeed in a universe roughly ten thousand times smaller than the home universe moved them the same distance as traveling a thousand times lightspeed, if that were possible; this was the standard cruising speed for their spaceships. She had studied this at the University of Edinburgh before she joined Concord.

But the utter lack of stars was still unnerving.

“Where are we going?” she asked the suit. It put up an overlay showing her route, to the left and poleward from her current orientation.

She walked to the edge of the airlock and stepped out into nothing. The moment she left the ship’s envelope she was nearly weightless, but she’d experienced that several times before and adjusted within seconds.

The maneuvering pack thrust her gently away from the ship and spun her so she was facing her goal. She thought of Nicolás planning this bizarre excursion, and wondered how he’d managed to put the surprise outside the ship without her hearing about it. *Someone* must have noticed the very unusual extravehicular activity. Concord ships didn’t need exterior maintenance, so there was usually no reason to be outside. Perhaps he had discussed it with the Captain or the Pilots beforehand so they could keep it a secret until he could surprise her.

There was just enough light from her helmet shining onto the ship’s rough surface to see that she was moving at a rapid speed. Subtle course corrections every few seconds kept her close to the skin. It was like flying a few feet above a frozen ocean, except that this ocean was purple—the color from which the ship got its name.

Suddenly the acceleration increased so drastically that her arms and legs flew backward and her helmet smacked the maneuvering pack. Within seconds she was tens of meters away from the ship.

“Suit, what are you doing?” she shouted.

“I’m sorry, I don’t know what you mean,” its quiet voice replied. “We’re heading toward the coordinates I was given at about thirty kilometers an hour. We’ll reach the target in about twenty minutes.”

“Are you crazy? We must be going at least twice that and we’re pulling *away* from *Violet*.”

“I think you must be mistaken. Are you feeling well?”

“Stop thrust *right now!*”

The acceleration stopped instantly. She could just barely see the ship, a dark shape against total blackness.

“Take me back to the airlock.”

“I thought we were supposed to retrieve something from the given coordinates.”

“Yes, and we’re moving farther away from it every second. Take me back to the ship *now.*”

“But we’re only six meters from the surface. I don’t understand.”

Something primeval kicked in. Emma reached down and unsnapped the thruster straps on both legs, then the one at her chest. She strained her eyes and could still see *Violet*. She swung the pack around, which sent her spinning slowly, and after a full revolution, when her back was to the ship, threw the pack as hard as she could out into space.

There was no noticeable change, of course, but it wasn’t until then that she realized that Seeüwit was shouting at her via the twitcher.

“Calm down,” she sent back. “I’m okay.”

“What happened?”

“The suit malfunctioned—”

“I did not,” it said.

“—and sent me flying away from the ship. I threw the maneuvering pack away and I think I’m headed back. Can you tell me if I’m right?” She couldn’t believe how calm she was. She wasn’t feeling any fear; as if knowing whether her trajectory would take her back to the ship or not was an abstract question, not life-or-death.

It took a moment for zim to get back to her. “Throwing the pack only slowed you by five meters per second, but based on your current position and velocity, *Violet’s* gravity should recapture you in about an hour and a half. You’re drifting laterally, though, so you won’t land anywhere near an airlock.”

“Oh.” She couldn’t think of anything else to say.

“I don’t understand what happened,” Seeüwit said.

“Remember what I said about excessively-reliable technology?”

“Yes.”

“Looks like that’s not the issue here.”

* * *

Emma and Seeüwit had spoken often during the last hour, but she didn’t have much to say (still drifting helplessly through black and empty space, thanks for asking), and Seeüwit didn’t have much to report. Ze had moved to an airlock nearer to her expected landing site, while a team of technicians investigated the fabricator.

“Emma,” ze said.

“Still here.”

“Your estimated time of arrival is about seventeen minutes from now. You’re tumbling a little, which complicates things, but we can predict within a few meters where you will land.”

“Are you about to tell me that I’m going to land in an airlock? Because that would be my best hole-in-one ever.”

Ze paused while, she assumed, ze tried to figure out the reference. “I’m sorry, not even close. You’ll be a few hundred kilometers from the nearest one. But I do have some bad news.”

“Landing in the middle of nowhere isn’t bad news? Oh, I guess you’ll just come get me.”

“Let me come back to that. What I was referring to is the nature of your landing zone.”

She laughed sourly. “I’m not going to fly past an engine while it’s firing, am I?”

“You know better—we’re not accelerating, or you and I would never have seen each other again. The problem is the velocity you’ve picked up on your way back.”

Violet was larger than Pluto but not nearly as massive; still, it had a significant mass, enough to give about .2g at the surface.

“What’s the problem?”

In the pause that followed, she could imagine, but not hear, zis tsheef ruffling from head to hands in the pattern that meant the same thing as a Human sigh.

“That area of the ship’s surface is essentially featureless. There won’t be anything to grab onto. When you hit, you’re going to bounce.”

“Surely not with escape velocity?”

“No, but it’s going to take you back out into space. I imagine you would rather be lying on the ship than floating out there.”

“Well, just come and get me. What’s going on?”

Another silent ruffling.

“We’ve discovered what happened to the fabricator. It’s been sabotaged.”

“*What?*”

“Someone tampered with the programming. The suit malfunction was intentional.”

“No! Not—”

“No,” ze said firmly. “There’s no reason to think that Nicolás did this, or even that he *could* have done it. We just assumed that he sent the message.”

“Then...”

“We don’t know yet. But the bigger problem is that we also don’t know how extensive the sabotage was. If it was just your suit, then I could be out to retrieve you before you reach us. But if it was less specific, any rescue attempt could end up with two victims instead of one. We have to be sure before we come get you.”

“Just send some drones!”

“We don’t have any vacuum-rated manipulator drones ready. They’re always fabricated on demand. And until we can trust the fabricators, we can’t be sure we’re not sending an assassin drone out after you.”

“Oh.”

“You have to be patient. You have plenty of air and water. You’re going to bounce, but you won’t be injured if you’re careful to land on your feet, and we’ll bring you back in as soon as we can.”

She couldn’t think of anything to say.

“Emma?”

* * *

“I wish I could twitch Nicolás,” she said some time later.

“You know that’s not possible. You’re in different universes.”

“Seven billion year-old technology, and you haven’t come up with a solution to that yet?”

“Emma, there’s no causal connection between one universe and—”

“It was a joke, Seeüwit.”

Ze was silent for a moment. “I find your Tribe’s sense of humor almost as hard to understand as your propensity for acronyms and slang. Don’t you think it would be clearer if you called it a quantum entanglement communicator?”

“Waste that,” she said. “It’s a twitcher.”

* * *

As she got closer to the ship and could orient herself, she started carefully twisting her body, learning how to use small movements to spin around and then stop the spin. She was trying to orient her feet toward the ship, as Seeüwit had suggested.

“Five seconds,” Seeüwit said in her head. She was grateful that ze didn’t count down.

Just before she landed she saw something. Without even knowing what it was, she reacted without thinking and wrenched herself around. Her feet touched the surface first and she instinctively bent them to absorb some of the shock, then flung out her arm and grabbed at the shadow she’d seen. Her gloved

hand closed around a recessed ring, some kind of handhold. Her body jerked and her feet flew out to the side. She almost lost her grip, then her legs smacked back down against the surface and bounced again. She got a better grip and in a moment she was more or less still relative to the ship.

“Touchdown,” she said.

“What?”

“There was some kind of handle just within reach. I’m down.”

“Handle? I didn’t know there *were* any handles on the surface.”

“It’s a big ship. Have you crawled around out here lately?”

“Are you okay?”

“Yes. I’m fine. Now what?”

“Just hang on,” Seeüwit said. There was no relief in zis voice—ze wasn’t Human—but she could imagine zis tsheef ruffling in contentment.

* * *

Over three hours after walking out the airlock, she was feeling lightheaded and starting to panic. There was still no word about the extent of the fabricator sabotage.

“I’m going to die out here,” she thought.

“No, you’re not,” Seeüwit said. She must have said that out loud. “Tell me about Moondog.”

“You’ve met her.”

“Yes, but I don’t really know much about her. You know that many Members are fascinated by the idea of pets.”

“Are pets a unique trait?”

“My dear, there are no unique traits, only unique combinations of traits. But it’s been a long time since any Tribe kept pets.”

“Yeah? How long?”

She waited. “The last were the Hihjobo. They went extinct over three hundred million years ago.”

“Earth years or Concord years?”

“I always translate units for you. It’s basic politeness.”

“Thank you. What do you want to know?” She looked up at the empty sky. She’d feel better if there were stars, or better yet a Moon, to tell stories by.

“How did Humans arrive at this symbiosis?”

“No one knows for sure. Our relationship with dogs is prehistoric. Some people think we co-evolved—dogs adapted to us, but we also adapted to them. They can read our facial expressions and gestures, and we’re pretty much helpless in the face of doggie cuteness.”

“Hmm. Cute. It’s a difficult concept. Well, tell me about her specifically.”

“She’s a Moon terrier.”

“Terrier—like terror?”

“No, the word comes from the French term for earth, or dirt. Long ago they were used to dig for vermin. After Contact, when the first Moon colonies started up, they wanted to take dogs with them, for mental health reasons I suppose, but the colonies were small and cramped, so they just took small breeds, mostly Cairn terriers. Over the next century or so they improved the breed, making them larger, smarter, and tougher, and intentionally selected for mottled gray and white coats. By the time the colonies were self-sufficient the dogs looked like the face of the Moon as seen from Earth. So, because they look like the Moon and come from the Moon, people call them Moon terriers.”

“How long have you had Moondog?”

“Mother gave her to me when I got the posting to *Violet*. A little over two years ago. She wasn’t even a year old when I got her, so she’s still young.”

“What’s her favorite activity?”

“Belly rubs.”

“I’m sorry?” Seeüwit didn’t really have a belly—that’s where zis mouth was—so she wasn’t surprised ze didn’t understand the concept.

“She will do anything for a belly rub. I remember one time— Oh.” She almost let go of the handhold as a wave of dizziness washed over her.

“Emma?”

“I feel strange.”

“Oxygen levels dangerously low,” the suit said quietly in her ear.

“What? How is that possible. There’s supposed to be two days of air. The fabricator told me—” She broke off when she realized what she’d just said.

“Oh no,” Seeüwit said.

“Oh, *waste me!* It was sabotaged twice. How much time have I got?”

The suit said, “Ten minutes before levels are insufficient to maintain consciousness.”

“Emma,” Seeüwit said, “I’m coming out.”

“Waste me, waste me, waste me!”

“Stop talking,” ze said. “Calm down and breathe shallowly. I’m going to risk it and come after you.”

“No. Wait. I have an idea. How much longer before they know?”

“I’ll find out.” She tried to force herself to be calm while she waited. “It will be about an hour.”

“Here’s what you should do. Make yourself a suit right now, but don’t come out yet. I’m going to slow my metabolism way down. As soon as you’re sure the damage was localized, come and get me, but not before! Promise me.”

“How will you slow down? Humans haven’t genetically modified themselves yet.”

“Meditation.”

“What?”

“Look, it’s too complicated to explain. I don’t want to waste my air. Just promise me you won’t come out until you know it’s safe.” She waited. “Seeüwit?”

“I promise. And I promise I will be there in time.”

Emma disconnected her twitcher and told it not to accept any incoming calls. She reached back in her memory for the mantra she had used all through her college years, when the stress had nearly overwhelmed her year after year, and only meditation and running had allowed her to get through.

Get through, ha! she thought. *I was the valedictorian!*

She calmed herself, mentally spread herself thin, and floated to her special place.

* * *

Bump.

Motion.

Bump.

Fresh air.

Emma took a deep breath and opened her eyes. The hilariously expressionless alien face of Seeüwit hung above her, one enormous eye above gills staring at her without blinking.

“Prince Charming?” she said softly.

“Welcome back,” ze said. “You have a welcoming committee. Let me help you stand up.”

Ze extended a thin, six-fingered hand. She took it and ze pulled her effortlessly up off the floor of the airlock bay.

She noticed that Seeüwit was wearing a suit too, very different from hers, five-limbed, not skintight, iridescent, helmet-less. And her helmet was off, too. Then she noticed the small crowd of aliens behind zim and gasped.

The Captain strode forward on his stork legs, ruffled true feathers, and extended all four hands, taking each of hers in two of his. He opened his beak and sang like a nightingale, which her twitcher translated as a husky voice inside her head.

“Emma Fuji, all of us are so very overwhelmed that you are back safely. I’m truly sorry that this horrific thing has happened to you. We hope you will recover quickly and help us with the investigation.”

He stamped his feet—which her twitcher informed her was the equivalent of a bow—released her hands, and stepped back. Emma thought she might faint again. She had never met the captain, or any other member of the Aashaa. Their Tribe was the second-oldest in the galaxy, and had served as the Directors of Concord since the Founders had gone extinct, around the time that life first appeared on Earth.

Then another Member stepped forward with a sound like castanets, and she thought for sure she was dreaming. It was one of the Pilots, the actual oldest Tribe; they looked like an armored Galapagos tortoise with a head on each end of the shell. She recognized zim from the bizarre, curled horns on zis back: it was Kee 9. She had met zim once or twice before while studying with Seeüwit on deck three, and ze had always been polite and friendly.

Kee 9 raised the edge of zis shell until it was at a forty-five-degree angle and looked up at her face with one beak-less tortoise head. Ze rumbled and her twitcher translated.

“I look forward to watching the interview about your adventure. I am thankful you are safe.”

She bowed shakily.

The others—many other Thweetts, a gaggle of low-slung boulder-like Mustjippits, a towering pair of ursine Uks—hung back but murmured their greetings and congratulations.

“Now,” Seeüwit said, “I believe Emma needs some rest. I’ll take her back to her habitat and we’ll do an interview tomorrow. Thank you all for coming to welcome her back home.”

“You brought me back in?” Emma said quietly.

“Of course I did,” ze said.

Just then the transport door opened and a single Kchik scurried out on all fours, its claws scrabbling and clicking on the hard aphrosine floor. Emma had never seen a Kchik in quadruped mode before, and usually their claws were retracted. Kchik were like a cross between a dromeosaur and an ant: reptilian limbs and head, but a deeply segmented body and stubby paired tails. This one had bare, lightly wrinkled skin like a macaw’s cheeks, a brown so deep it was nearly black, with a distinctive mottling on his arms. It was Fichtek, a Kchik she had spoken to many times before.

He rose up to biped mode, which made him slightly taller than she was, and spoke in a squeaking, singsong voice like a large hamster.

“Emma,” her twitcher translated. “One is relieved beyond words that you are safe.”

“We were just leaving,” Seeüwit said. “She needs to rest and get something to eat.”

“Of course. One is very sorry one was late. Please excuse.”

She took his strong, four-fingered hand—claws retracted now—in hers and thanked him. Seeüwit led her into the transport and she sagged down onto the bench.

Interview #1 with Human Emma Fuji

11 June 519 AC (2632 AD)

7/5/307,597,920/109

The very first interview, shortly after Emma came aboard Violet. Seeüwit and Emma face each other in a public rock-and-water garden on deck three. She sits on a polished obsidian chair, ze squats in triped mode.

S: Welcome to *Violet Enforcer*.

E: Thank you! I’m so very happy to be here.

S: As you know, but some of our viewers may not, one of the primary reasons you were asked to join *Violet's* crew was for these interviews.

E: Actually, they told me that this was my real job. Everything else is just frosting on the cake.

S: Cake?

E: Ah. A sweet confection, often eaten for celebrations.

S: Well, this is definitely worthy of a celebration. You're the first Human to ever serve aboard an Enforcer ship. Can you tell us something about your background?

E: Of course. Ah. I was born in Caledonia, which is the northern half of a large island on Earth. My mother is a doctor, also born in Caledonia, and she served for over ten years on *Periwinkle Monitor*, which is the mostly Human-crewed ship. My father is a social worker from Japan, which is a series of islands halfway around the world from Caledonia.

S: How did they happen to meet, being from such faraway islands?

E: Ah. Well, you may know that Earth is not yet fully recovered from the Waste. Things began improving almost immediately after Contact, but there are still problems. Caledonia was having one of their periodic famines, and my father had come as part of a relief organization to bring food and help with remediation. Since my mother was a doctor, and he was working in our hometown, it was natural that they would meet at some point.

S: Tell us about your education.

E: I studied general science and poiology as an undergrad at the University of St Andrews in Caledonia. Then I got a PhD in Concord studies at the University of Edinburg. That's also in Caledonia.

S: So you didn't go far from home. Until now.

E: Ha! Well, I worked on *Periwinkle*, like my mother, for about a year before transferring to *Violet*.

S: What did you do on *Periwinkle*?

E: I helped run the poiology observation platform. We didn't hope to discover anything new, but we're young, so we have a lot of learning to do.

S: Can you explain poiology? Not all of our viewers will be oriented to science.

E: Ah. Well, before Contact we had scientific disciplines on Earth called cosmology, which was the study of the origin and history of the universe, and particle physics, which was the study of subatomic particles. Poiology is essentially the merger of those disciplines, except we don't study particles, of course. That would be like trying to understand the origin of the universe by studying cake.

S: Ha! Cake again. I'd like to try this cake sometime. So poiology is the study of the nature of the universes using Fless fields.

E: Yes, exactly.

S: Now, did you start working on *Periwinkle* right after university?

E: No, I did my postdoc interpreting technical reports from *Periwinkle* and other ships, and apprenticing with other Human poiologists. And I spent part of every year working with my father. He still travels all over the world helping with remediation.

S: I understand that a few years ago, for the first time in centuries, ice formed at Earth's poles.

E: Yes, it was a tremendous milestone. There were parties all over the planet.

S: With cake?

E: Ha! Yes. Lots and lots of cake.

The Emergence of Macaroni and Cheese

"You need rest," Seeüwit said.

"What I need is a shower."

She opened the cottage door and Moondog exploded out to greet them as if she hadn't seen Emma in a year. The dog bounced in a circle around her, barking with excitement, then flopped on her back right in front of Seeüwit. Ze curled one foot into a hand and gently rubbed the soft, exposed flesh.

Emma walked into her house and Seeüwit followed. Moondog suddenly realized the ecstasy was over, bounded up and trundled after them.

"I'm going on back. Would you mind waiting for me?"

"Of course not. I have some things to tell you when you're done."

Emma left zim crouched in the sitting room of her cottage with Moondog sitting up facing zim, tongue out and panting, clearly trying to decide whether another belly rub was possible.

She had left one corner of the room empty so ze would always have a place to sit. The rest was lightly furnished: a pair of oversized chairs, a center table, a few lamps, and a framed original watercolor painting of the ruins of Edinburgh Castle that her father had made when she was twelve.

She walked out the back of the cottage and up the wooded path, which was paved in a soft, nubbled, rubbery substance that she had never got around to asking about. The path ended at a lake of about one hundred hectares that was completely surrounded by hardwood forest. To her right the land rose into an impressive rocky hill, with many exposed boulders. The nearest of these jutted out over the water, with steps carved right into the solid rock. She ascended, stripped off the spacesuit, and dove in to the water.

It was cool, not cold, and it felt wonderful after so many hours encased in the suit, wondering if she were about to die. She dove down through perfectly clear water to the lake bed, not even ten meters deep, where sunlight illuminated the waving, fronded plants, and surfaced near the rock she had jumped from.

Just past that rock was an alcove in the granite beneath a stream of water flowing down into the lake, and sealed compartments built into the rock. She opened one to get her soap and lathered up.

"A little warmer, please," she said, and the shower temperature rose a few degrees. When she had rinsed off she took a bath robe from another of the compartments, wrapped it around her, and went up another set of rocky steps back to the top of the diving rock. She grabbed the empty spacesuit and walked back to the cottage.

The towel and the suit went in the recycler. She dried her hair perfunctorily, dressed quickly in pants and tunic, both dark blue, and stepped into a pair of slippers.

She stuck her head into the sitting room. Seeüwit was crouched just as she'd left zim, and Moondog hadn't moved either. "Come into the kitchen," she said. "I'm going to cook some macaroni and cheese."

Ze had to duck zis head to come through the passageway. The cottage was based on an ancient place she had visited once near her home town of Aberlour. She couldn't remember who had lived there; a friend of her mother's, probably. *Violet* had built it for her, along with the surrounding grounds, including the lake, when she had accepted the posting. The habitat itself—and all the forests and ecosystems within it—was over four centuries old. It had been waiting all this time for a Human to come live in it.

"Is there something to 'macaroni and cheese' other than the obvious mixture of dried flour paste and curdled, aged ungulate milk?"

"Much more. It's the ultimate comfort food."

"Tell me about it."

"It was invented in England, the country to the south of Caledonia, where I was born. I don't know when. Now cheese is ancient, as old as animal husbandry probably." She caught herself. "Well, ancient by our standards, anyway. Pasta was invented by... the Romans, maybe, or the Chinese, I can't remember. But something magical happens when you mix them together."

The fabricator had thousands of Human meals in memory that could be manufactured in minutes, but Emma often preferred to cook for herself. She zapped a package of noodles, shredded a huge pile of sharp cheddar cheese with the chopping machine, mixed them together with some spices, and molded it

into a casserole dish. Then she carefully poured milk over the mixture and scattered more cheese on top. She popped it in the cooker and sat down at the rustic wooden table under the window.

Then she noticed Moondog sitting on the floor, looking up at her. She held out a small piece of cheese. Moondog swallowed it and went to lie down in her little bed in the corner.

She said, “You know what emergent properties are, of course.”

“Of course. A phenomenon that arises at one level of complexity that cannot be predicted from the next lower level.”

“Like chemistry can’t be predicted from physics.” Ze ruffled zis tsheef in amusement. “I mean, like *we* couldn’t predict it before Contact. I had a professor at St Andrews that was trying to explain emergent properties once. He said, ‘You can learn everything there is to know about Fless fields, quantum physics, quarks and leptons, atoms and molecules—and you would still not be able to predict how good macaroni and cheese will taste.’ I thought that was rather profound.”

“Your professor was right. I watched you make it, and I can’t predict how it will taste. May I try it?”

“Of course.” She looked at the timer above the cooker and increased the temperature. “Just a few more minutes. Do you want anything else with it?”

“No, thank you.”

“I’m going to have a salad.”

She spent a few minutes tossing together some greens, a few shredded vegetables, and some dried steelberries with a pre-made dressing. By then the casserole was ready. When she took it out of the cooker Seeüwit fluffed up in surprise.

“It’s beautiful,” ze said. “And it smells... complex, savory. Delicious.”

Emma looked down at the dark golden topping on the noodles. “It is pretty, isn’t it? Here, have some.”

She scooped a small helping out onto a porcelain plate. She knew better than to give Seeüwit a big serving. Ze loved tasting Human foods, but never ate more than one or two bites. Zis chemistry was very different from that of Humans, so ze couldn’t use her food for nutrition, but ze had a profound sense of taste. Undoubtedly there were things in her cuisine that would poison zim—maybe the pinch of cayenne she’d added—but zis phylax cells would protect zim from any harmful compounds, just as they allowed zim to breathe her habitat’s Earth-normal air, which was definitely not the mix of gasses ze was born to.

“It *is* delicious,” ze said. “I will tell my family about this. Perhaps we can recreate it using Thweett ingredients.”

Emma took a large helping for herself and sat down again. The first bite took her right back to her mother’s kitchen in Aberlour.

When she had made a substantial dent in the pile, she felt comforted enough to say, “Okay, you said you had something you wanted to talk about.”

Ze fluttered zis tsheef in mild distress. “This isn’t going to be easy to hear.”

She put down her fork and sat back. Suddenly she wasn’t hungry anymore. “Go ahead.”

“While you were outside, we had a team examining the fabricator system. It started out small, but eventually there were over a hundred thousand people involved. They were able to prove to everyone’s satisfaction that the sabotage was very precise.”

“What does that mean?”

“It means...” Ze ruffled zis tsheef again. “You were specifically targeted.”

“Oh.” It felt as if someone had punched her in the stomach.

“All the potential designs that the fabricator might have used to build a spacesuit and maneuvering pack for a Human were compromised.”

“And nothing else.”

“And nothing else.”

They looked at each other silently for a moment.

“Do they have any idea who did it?” Emma asked.

“They don’t know who. But they do know when.”

She caught something in zis posture. “No. That’s not possible.”

“It’s certain beyond any doubt. The designs were tampered with while *Periwinkle Monitor* was docked with us. Sometime during those five days, someone was able to insert a virus into the fabricator.”

Five days of laughing and swapping stories with other Humans for the first time in over a year. Five days of exploring the wilderness of her habitat with chattering, friendly strangers. Five nights with Nicolás, the best friend she’d made during her time on *Periwinkle*—who had turned into more than a friend almost as soon as she’d arrived, after a long night alone together during which they had discussed their families, Human and Concord history, art, science, music, and food.

Five days during which someone had decided that she had to die.

“It doesn’t make any sense,” she said. “Who am I? I’m not important. I’m one solitary Human on a ship with a million other inhabitants.”

“Here’s something else that doesn’t make sense,” ze said. “The fabricator wasn’t the only thing sabotaged.”

“What else?”

“Once they discovered what had been done, the Captain and the Pilots authorized a full security sweep. Nexus went through every computer system on the ship, and every available adult Pilot, Thweett, and Aashaa were engaged to search all the engineering spaces.”

“That’s a volume larger than some moons!”

“Yes, but the search team was almost half a million people, and most of the systems in there are either completely sealed or inaccessible to anyone but a Pilot. With the scanners they have available, it didn’t take very long to check everything.”

“So, they must have found something. You said there was other sabotage.”

“Yes.” Ze paused.

“What?”

“They found a bomb. A very small antimatter bomb. It was on the inertia exchangers.”

“What does that mean?”

“It was set to go off just as we translate back to our universe. The inertia exchangers make it possible to travel quickly without building up velocity before we translate in, or having to dump velocity after we translate out. As we translate into the traveling universe, the ship momentarily loses all inertia, so we accelerate up to one-tenth lightspeed during the translation. On the way back out the reverse happens, so momentum is conserved.”

“What effect would the bomb have?”

Seeüwit hesitated again. “If the inertia exchanger failed during translation, the ship would probably retain its speed but it’s indeterminate what would happen to its inertia. Most likely small regions of the ship would gain momentum, adjoining regions would lose it, all utterly at random, and the ship would shred itself, down to the atomic level.”

She stared at zim in horror.

“*Violet* would have been reduced to a cloud of plasma expanding as it traveled at one-tenth lightspeed.”

“Who...” Her voice failed her. She coughed and took a sip of water, but she couldn’t get anything else out.

“We don’t know. The explosive device is being studied now. We’ve never seen this tech before.”

“What does that mean?” she croaked. “It’s more advanced?”

“No, it’s rather primitive, actually. But every technological race leaves telltale signatures in their creations: techniques of construction, choice of materials, design patterns. This is a style that has never been recorded before, so we can’t say immediately who built it. It was apparently *not* manufactured by any of the Member Tribes. That’s all we know so far.”

“So now what?”

Ze stood up in quadruped mode and laid zis traveling hand on one of hers. Six equally-spaced fingers radiated from a large palm; they were longer and thinner than hers, stronger, with more joints. But it still felt like the gentle touch of a friend.

“Rest. Sleep. Play with Moondog. Tomorrow you will put away your studies and begin a new research project. You were targeted specifically before the rest of the ship, and there must be a reason for that. You will help us find who did this, and bring them to justice.”

Stubborn

24 March 521 AC (2634 AD)
7/5/307,597,925/122

Simple Tasks

Violet Enforcer was built something like an onion with a really, really large core. Three outer shells alternated with decks of the same thickness, roughly thirty-three kilometers. The fourth, innermost shell was twice as thick, leaving an interior engineering space that was almost two thousand kilometers in diameter. Although Emma had never seen it, she understood from her studies that this enormous volume was almost entirely filled with machinery: the inertia exchangers that had nearly been destroyed, the bubble drive, reaction drives, gravity generators, power generators, and weapons. Lots of weapons. Enforcer-class ships were warships, though rarely used as such.

The outer deck was largely stores of raw materials (half of it water), shuttle bays, weapon emplacements, and the larger fabricators. The middle deck contained seven habitats in use—and one spare—plus support systems for each habitat, including redundant environment controls, small fabricators, raw material caches, and multiple layers of shielding. The innermost deck contained the Pilots' habitat, the ship's computer system Nexus, more raw material stores, and all of the command and control areas.

Over a quarter of each deck was taken up by structural supports and passageways for the drives, weapons, shuttles, and transport. The bulk of the transport system ran through the solid shells, but since the sky—or roof—was thirty-three kilometers above ground level on each deck, some parts of the vacuum tunnels had to pierce the decks. On the habitat level all these pass-throughs were either disguised as mountains or hidden between the habitats, but on the other two decks they were naked aphrosine tubes, anywhere from one to a hundred kilometers in diameter.

The height of the decks was about a third that of Earth's atmosphere up to the edge of space: the roof was near the top of what would be the stratosphere on Earth. This was more than enough to give Emma real weather, including clouds, and although the ship exercised some control, the system was designed to exhibit occasional random behavior to better simulate life on a planet.

So she thought it was appropriate that when she stepped out of her cottage the next morning, it was raining.

She had managed to sleep, but knowing that someone had tried to kill her sucked the fun out of working on the ship. She had thought she was popular. The number of people watching her interviews with Seeüwit in real-time had increased steadily with each one, and retrievals of the stored interviews kept growing too. The Pilots seemed to like her, the Thweetts were all very friendly, the Kchiks had always been polite and solicitous. Although she hadn't spent much time with the other Tribes that lived on *Violet*, when she met them they were at least polite, and several of them had come to congratulate her on her safe return.

Maybe, she thought, they didn't come to congratulate me. Maybe they came to confirm for themselves that I survived their nefarious plot.

She shook that thought off. If she was going to be that paranoid she should just give up and go home.

The transport took her back to deck three, just like the morning before. She could only hope that today would turn out better than yesterday.

* * *

Every deck had areas where people usually did not go: raw material storage, environment control, equipment bays, and so on. These were the realms of the machines, which generally ranged from smart to very, very smart, but they were not conscious. There were no artificial intelligences on the ship.

Each habitat was suited to the particular Member Tribe that lived there. The common areas on deck three tended to be small cities surrounded by bare plains. There was really no point in trying to fill the unused spaces with vegetation; no matter what they chose it would probably be poisonous to one Tribe or another, and while every Tribe—including the Humans who worked for Concord—had phylax cells in their bodies that protected them and regulated their internal environment, it was considered ill-mannered to overtax them.

So although the Tribes that had populations on *Violet* were chosen for their compatibility—similar requirements for gravity, illumination, and atmosphere—the areas they shared tended to conform to the bare minimum, which meant naked aphrosine or stone.

Emma thought the effect was like some little towns she'd seen in Arizona, without the cactus.

She could have done most of her work, except the interviews, from her cottage, but the whole point of her being here was to introduce Humans to more Members. So she spent at least part of most days in the city of Frongstay, which was dedicated to non-critical research and scholarly activities. Frongstay's population at any moment was about twenty thousand, but throughout a typical day over a hundred thousand people would come and go. The lounge where she and Seeüwit did her interviews was here, as well as a small office building that had been set aside for her use. There were hundreds of other cities on deck three, dedicated to command, communications, ship maintenance, and so on, but Emma had never seen most of them.

Seeüwit was waiting for her in the front room of her office building, which contained only a desk with a Nexus interface and one chair. Ze almost always got there first; she had not decided if ze never slept, didn't need any preparation time in the morning, or knew a shortcut down from the habitat deck.

"Good morning," she said. She headed for the fabricator terminal to get some coffee.

"Good morning. Did you sleep?"

"Some." She decided on a whim to finally ask. "Do Thweetts sleep?"

"Ah. Not the way you do. We spend some time every day resting, but never fully lose consciousness. Most Tribes engineer out that need, if they had it to begin with."

She sat down at the desk and sipped her coffee. It was a dark roast this morning—different every day, because she'd asked the fabricator to cycle randomly between the beans and brews it had in memory.

"I wonder if I would recognize these future genetically-engineered Humans you keep alluding to, if I could meet one."

"I think you would. Very, very few Tribes modify themselves radically. The most typical changes are extending lifespan, improving sensory apparatus, correcting bizarre anatomical side-effects of evolution—"

"You mean like our appendixes, blind spot, and bad teeth?"

"Exactly. And usually there are also tweaks to the mentality, again correcting quirks resulting from the struggle for existence and dominance. And removing the need to sleep."

She hesitated. "Is it permissible to ask someone what changes their Tribe made?"

"It is usually considered bad manners. But if you want to ask me, I will be happy to answer."

"You removed the need to sleep?"

"Yes. That trait is rather common among multi-cellular organisms, but we felt we didn't require it anymore."

"And extended your lifespan?"

"Yes."

"So... how old are you?"

Ze hesitated. "Quite a bit older than you."

She sipped again. "How much older?"

"Well, let's just say that I remember vividly the day Concord made contact with Earth."

"That was 521 years ago!"

“Earth years, yes. Almost fifteen hundred Concord years.”

“I don’t understand,” Emma said. “Your Tribe is ancient, and you’re personally at least five times older than any Human who’s ever lived, but you spend all day babysitting me. Why?”

“I volunteered,” Seeüwit said. Zis tsheef ruffled in amusement, then a pattern that Emma had recently learned to interpret as fondness.

“Why?”

The tsheef ruffled again. “Because I like Humans,” ze said.

* * *

“Are you ready to get to work?” Seeüwit said.

“Absolutely.” Actually, she was still feeling shaky, but she thought it would be better for her to be working than lying around in her cottage.

“There are now sizable teams working on the explosive device and the fabricator malfunction. These areas are not outside your ability, but they do require technical experience you currently lack. We wanted to give you something you could work on immediately without a few years of training, and also something you might have more of a, ah... vested interest in.”

“The message I got?”

“Yes. Your task is to find out who sent it, when they sent it, and from where.”

“But that should be obvious, right? The messaging system keeps routing information and logs, and the message itself should mirror all that in its headers.”

A complex wave passed through zis tsheef. “Yes.”

“Oh. I guess *should* is the important word.” She activated the Nexus interface, which was a flat panel on the desk. “Show me the message I got yesterday about going outside.”

The text of the message appeared on a holographic display surface which the interface projected in midair above her desk. Emma reached out and made a gesture to rotate the pane. Hiding behind it were stacked layers of routing data.

“Waste me,” she said in wonder. “I’ve never seen anything like this. The messages I get from Nicolás, from the other side of the galaxy, usually have eight or nine layers. This has...” She tried to count and gave it up. “Nexus, how many routing labels?”

A voice from the interface said, “Ninety-seven.”

Seeüwit stood up. “Good luck. Let me know if you find anything enlightening.” Ze walked out.

“I’m going to need some more coffee,” Emma said to herself.

Interview #5 with Human Emma Fuji

6 August 519 AC (2632 AD)

7/5/307,597,921/28

This was the first interview in Lounge 751, where all subsequent interviews took place.

S: Some of the things I’d like to discuss with you may be uncomfortable, but I want you to know that we’re not judging you or condemning you. We just want to know you better—the bad as well as the good.

E: I understand. I’ll do my best.

S: Can we discuss the Waste?

E: Of course. I wondered when you’d get around to that. It’s the reason I’m here, isn’t it?

S: It’s the reason Humans are in Concord. It’s a long chain of logic and happenstance from that catastrophe to you speaking with me here today.

E: Ha! It’s nice to know that Humans aren’t the only Tribe that can be pedantic.

S: I’m just trying to make you feel at home.

- E: [*Long burst of laughter.*] Sorry. Where to start? Well, a bit over eight hundred years ago Humans began the transition from agrarian to industrial societies. Not all nations, or even all populations within certain nations, did this at the same time, but that's when it began.
- S: You may not know that it's quite unusual for a Tribe to be broken into so many competing jurisdictions.
- E: Yes, I did know that. Too bad for us.
- S: How many nations were there?
- E: At the worst, over two hundred.
- S: [*Tsheef fluttering in mild dismay.*] Please continue.
- E: It took us less than three hundred years to use up all the stored hydrocarbons that had been accumulating on our planet for three hundred *million* years. Along the way we melted the ice caps that had covered both poles for millions of years, heated the atmosphere until the global climate was changed, and pushed over half the species on the planet into extinction. At that point, I guess, we were next. That's why we call it the Waste: wasted our resources, wasted the living world, wasted our chances to do the right thing, wasted our potential, almost wasted ourselves.
- S: Can you tell us what happened when things started to get very bad?
- E: Well, the sea level rose almost a hundred meters, which flooded most of the major cities on the planet. Some entire nations were underwater, others lost a significant part of their land surface. So billions of people were displaced, and when they went looking for new homes they met resistance from the people who were already there.
- S: So—war?
- E: War. Disease. Famine. The climate change and the sea level rise destroyed our ability to grow enough food, and the wars made it impossible to transport what little food or medicine there was. Not to mention that when the fuel ran out... there was nothing to transport it *with*. People fell to eating anything, including any animal they could get their hands on—even each other. We had lost almost everything, but we still had a lot of weapons left, so we set about exterminating ourselves just as efficiently as we'd wiped out the other species. The population dropped from around ten billion to just over one billion in a couple of decades.
- S: I think that's where we came in.
- E: There's no way to express this profoundly enough, but on behalf of my entire Tribe—thank you.
- S: On behalf of Concord, you're welcome. There are only two things that will make us intervene with a young Tribe: leaving your home system, or stepping to the brink of extinction.
- E: I wish it had been the former. I'd feel a lot more pride in my people if we had worked through our troubles and joined you as a successful Tribe.
- S: You are not the first or even the hundredth Tribe to join Concord for this reason. I don't want to sound condescending—I know you're not a child—but your Tribe as a whole *is* a child, and some children need a little guidance to find their way.
- E: No one knows that better than I do. Some Humans may feel resentful, but I am not one of them. I feel nothing but gratitude.

Sifting

Emma's primary task was to help Nexus figure out where the message that had lured her outside had originated. She hoped that when they accomplished that they would know who had sent it, but she didn't really believe it.

Each of the ninety-seven routing labels on the message was a hand-off from one system or subsystem to another. Every label included a vast amount of information. The very least of it was the time the data was received and the time it was forwarded on, but this included details on the relation of the handler's local time to Galactic Standard Time (made possible by quantum entanglement), and

whether there was unresolved relativistic time dilation, and the estimated amount of such, and the algorithm by which the difference was calculated—including logs of acceleration changes with time stamps, each of which also had voluminous documentation and footnotes.

The headers also contained comprehensive identification of the system that performed the handoff, including where it was located—planet, moon, ship, station, routing buoy; and the position in galactic coordinates at the time of the transfer. There was a book-length section describing the hardware and software specifications of the messaging system used.

Then there was a list of the sites to which the message was being forwarded, always more than one so if there was some kind of mishap in one place the message would still get through. Each message had a galactically unique identifier, and if it was part of an ongoing conversation or a reply to another message, those were also identified.

Routing protocols, priority indicators, encoding status, encryption keys, authentication certificates, content analysis, and format specifications: it would have taken her several hours to read each header, even if it all of it were actually text that could be read like the message body itself. Of course, this was the decompressed and decoded version. As sent, each header took only a few hundred characters.

The first step was to build a timeline using the time stamps in the headers. Nexus immediately found a problem.

“The times don’t work,” it said. “There are five steps where the message was forwarded before it was received.”

“What does that mean? Time travel?”

“Not possible in a 3+1 universe such as ours.”

She’d been kidding, but Nexus had no sense of humor. “Any thoughts on what it means?”

“Sorry.”

This was why Seeüwit had not left the whole task to Nexus. It was not an AI. It was very smart, but it had no creativity.

After some thought, Emma said, “I think it means that we can’t trust the integrity of the routing labels. Some of them must be fake. Can you scan them for correctness? I mean, other than the time. Check whether the protocols are valid, and the relative time calculations make sense, things like that?”

There was no discernible pause while Nexus did this. “There are seventeen labels with inconsistencies other than the timestamps. The problems are minor, not enough to cause the message to be rejected, but probably indicate that those labels were falsified.”

“What’s the overlap between the five with time problems and the seventeen with other problems?”

“All five with time inconsistencies also have other errors.”

“Show me the other errors.”

Seventeen windows opened up in the air above the desk. Each one showed part of the routing information, with certain portions of the text highlighted and in context. Most of it was meaningless to her, but she saw something that was repeated in many of the windows. Much of the text had been translated to Napian for her, but over half of the errors had two untranslated, adjacent symbols. One was something like a snowflake, the other looked a little like a harp.

She reached out and circled these symbols on one of the displays. “Can you tell me what these symbols mean?”

“They’re not used in any of the common Concord scripts,” Nexus said. “Searching the archives.”

It took minutes—an unprecedented delay in Emma’s experience—before Nexus said, “The first symbol is an ancient glyph that was once used to represent ‘machine intelligence,’ what you would call AI. It’s from an extinct Tribe that was one of the first to attempt to create AIs that would not immediately go Hermit. They never succeeded, of course. The second is from the same source, and it means ‘help.’”

“What? ‘Help AI’ or ‘AI help’?”

“Either could be the correct interpretation.”

“What are those symbols doing in a message header?”

“Unknown.”

She shook her head. “Okay, file that. Can you construct a map of the path the message took?”

A map of the galaxy replaced the error windows, with the path shown in a green line that lurched in an apparently random way from one side of the disk to the other, out to one of the orbiting globular clusters, back in almost to the central black hole, out to the rim, and so on, in ninety-six steps.

“Use a different color for the legs that have errors.”

A bunch of disconnected lines turned red. There was no apparent pattern to the green versus red legs.

“Can you make any sense of that?”

“Not at the moment.”

“I’m going to need more coffee,” Emma said.

No place like home

On the third morning after her near-death experience, Emma felt well enough to resume her dawn runs. Usually she did these roughly every other day, and that morning she woke up feeling the urge.

“Want to go for a run?” she asked Moondog, who yelped and ran to the doorway, where she sat and fidgeted until Emma was ready.

From the front door of her cottage she jogged left, away from the path to the transport, and took a well-worn trail into the woods. Moondog loped along at her side, tongue hanging from her mouth and looking even happier than she usually did, which made Emma smile as she ran.

The land sloped gently up in this direction, away from the lake, until she broke out of the woods and was running along an open ridge with the forest on her right and the lake visible some distance away, at the bottom of a scarp on her left. She increased the pace and Moondog barked in joy as she broke into a full run.

Suddenly the dog jinked right and headed into the woods, probably after the scent of a squirrel or raccoon. Emma didn’t worry; Moondog did this all the time and there was nothing in the habitat that would hurt her. The cougars and bears had been trained—Emma had never learned how—to avoid them, and even if the dog encountered one it would simply turn away. Moondog was smart enough not to provoke them, and nothing short of a full-on attack would make the wild creatures attack her.

The rocky ridge she was following got lower after a few kilometers, as the forest crept closer, until she was back in the trees and not far from the water. Leaves of gold and brown fell silently, sporadically from the branches as she passed. Eventually the trail intersected another that ran along the lakeshore, and she followed it for another kilometer before turning around.

When she reached the junction again she kept on the lake trail. The water was on her right, still as glass in the windless morning. She heard a melancholy bird call from across the lake, then suddenly Moondog was running alongside her again, grinning her doggy grin and pacing Emma effortlessly as if they’d never been separated.

When they got close to the cottage, after about a ten kilometer run, both of them were breathing hard, but Moondog looked the way Emma felt: a little tired and hot, but happy. At the bathing place Emma shucked her running gear and dove into the lake. She surfaced to find Moondog lying in the shallows, splayed out with only her head above water, panting and grinning like an insane thing.

* * *

“Have you made any more progress?” Seeüwit asked shortly after she arrived at her office.

“Some. I’ve verified that at least twenty-three of the ninety-seven routing labels were fabricated. Of the ones that are almost certainly real, seven were from *Violet* and eleven from *Periwinkle*. Between the two ships there are twenty-five more that might be valid. All the rest are external, and eight of those are probably real. There’s a limit to what I can do here in the bubble, though. Until I can get independent corroboration on the external labels, I can’t work out the true route or trace back to the source.”

“Well, you’re in luck then. We’re translating back in about ten hours.”

“Really?” She queried her twitcher and confirmed that. “I lost track of the date. Okay, I’ll spend the rest of the day getting my inquiries ready to send out. And I have a lot to tell Nicolás; I need to write him a message too.”

Twitchers had unlimited reach within the same bubble, but limited bandwidth: video was too much for the entanglement to handle. Voice was no problem if both people were in the same bubble, but she knew Nicolás’s schedule, and he would be unavailable for another eleven days. She could record a voice message that would be forwarded once Nicolás popped back into the same universe, but she didn’t trust herself not to say something that would alarm him. She’d settle for text.

“Do you want to meet for the translation?”

“Oh. I almost forgot. Yes.” The two of them had watched together almost every translation that *Violet* had performed since Emma had joined the crew. “I’ll meet you at the usual place half an hour beforehand.”

“See you then.”

* * *

Violet had no windows. Except for shuttle bays, drive and weapon portals, and the airlocks—all of which were heavily shielded by thick doors reinforced with fields—there were no compartments closer to the outside of the ship than deck one. A window thirty-three kilometers thick would not be transparent, no matter what it was made of, and anyway there were no lounges or cabins anywhere on deck one.

A popular gathering place for watching exterior events was the Pilot’s Lounge on deck three. Officially it was Lounge 1, but since there was almost always a Pilot in attendance, no one called it that.

The Pilot’s Lounge was the biggest on the ship. Its other unique aspect, beside the constant presence of a Pilot, was an enormous view screen over a hundred meters side-to-side and half that tall. If you stood right up against it when they were traveling in their own universe you could easily see what color the distant stars were; it was like being inside the world’s biggest telescope. But then you’d miss the big picture—or even the medium-sized picture—so Emma and Seeüwit usually sat in one of the elevated viewing alcoves far at the back of the lounge.

There were hundreds of these alcoves set into the far wall from the screen. Each had seating or standing space for perhaps a dozen of each of the eight Tribes resident on *Violet*, and for several others that only visited occasionally. Early on Emma and Seeüwit had picked one of these house-sized boxes as “theirs,” so they would always know where to meet if they came separately. When Emma arrived ze was already there, talking to several other Thweetts.

Conversation among Thweetts was like the mating dance of herons. Their tsheef were always in motion, ruffling and settling in complex waves that passed up and down their bodies, stopping abruptly and reversing, fading out and suddenly fluttering again. Although they usually adopted a bipedal stance they did not stand still: the neck and three free arms moved sinuously and continuously, and they also shuffled and shifted on the hands being used as feet. Interspersed with the movement were complex trills, whistles, and clicks, which flowed rapidly, more like music than like Human speech. But Emma had always got the impression that the vocalizations were ancillary, that the main thrust of the conversation was visual.

It was impossible to sneak up on a Thweett; one of their three eyes was always facing you. Without stopping the dance ze was doing (including the vocalizations, since Thweetts had three tympanums as well as three eyes), Seeüwit said, “Emma, hello! Come on over.”

She didn’t recognize the other three Thweetts, but the vivid colorations on their tsheef, while unique, very extremely complex, so it was possible that she’d met them before and simply didn’t remember. She recognized Seeüwit only by long association and by picking out two features: ze had a band of cobalt blue traveling down each limb and a golden spiral radiating from the hidden mouth in the center of zis chest. The rest of zis tsheef were of many different colors, without any other obvious patterns. Zis

friends each had their own distinctive traits—an iridescent green bullseye just below the neck, a crimson zigzag all the way around the head—but she couldn't recall seeing them before. There were over two hundred thousand Thweetts on *Violet*, so it might be more remarkable if she did recognize these three.

“Good day,” she said.

“Emma Fuji,” Bullseye said, extending a spindly hand. She took it and twisted it gently the way Seeüwit had taught her. “Ssattafer. I have been watching your interviews with great interest. It's a pleasure to finally meet you.”

“And you,” she said. “I regret that I haven't met more of Seeüwit's friends.”

“We must rectify that,” ze said. Ze turned to Seeüwit and they had a very high-speed conversation involving trills, clicks, and what looked like a jitterbug.

Seeüwit said, “Ssattafer suggests that we should invite you to visit our habitat. I believe that is a wonderful idea.”

“I would absolutely love that,” Emma said. “I haven't seen any of the other habitats yet.”

“Ah,” Ssattafer said. “You may not want to visit them all. Despite the phylax, it's not clear how long you would survive the Pip-vesh or Mustjippit habitats. But the other five should be safe enough for Humans.”

“I thought all the ship's crew were chosen for compatibility,” she said.

“Well, what is really selected is whether they can survive each other's atmosphere, lighting, and gravity, so that a common ground can be established on the command deck. I think only the Pilots could survive indefinitely anywhere on the ship.”

“What makes those two habitats so threatening?”

“Ah,” Seeüwit said, interrupting Ssattafer, who was clearly about to explain. “I think that would be an excellent research project.”

Ssattafer laughed and zis tsheef rippled.

The other two Thweetts introduced themselves, but apparently they didn't speak her language, because their brief but friendly comments were translated by her twitcher.

They turned to look out at the view screen, which still showed the black, featureless space of this nearly empty universe. Only a status panel on the right of the screen showed that it was actually working.

On the floor of the lounge were numerous meeting areas, some sunken, some raised. Many of these were occupied, most monospecific but some with mixed Tribes. Other groups were standing or reclining on the main floor. She was able to spot many individuals of each of the other seven Tribes that traveled in *Violet*, although she had to look hard to find the Pilots, who seemed sparser than the others despite the unofficial name of their lounge. Looking out at these friendly aliens, which must number in the thousands, Emma was suddenly acutely aware, as she rarely was, that of the nearly one million people on this ship she was the only Human.

“Two minutes,” her twitcher said.

Emma walked over to the refreshment console and got a glass of Cabernet from the fabricator. She sipped and walked back to stand beside Seeüwit.

“Nicolás won't be back for eleven days,” she said quietly.

“I know.”

“I wish he were here now.”

Seeüwit rested one spindly hand on her shoulder. They looked out at the screen just as it flashed.

Almost too fast to register, the screen ramped up from the utter blackness of empty space, to the red of heated iron, to searing white, which faded swiftly to show the familiar space of her home universe—stars of every color and intensity everywhere she looked, tiny smudges that were distant galaxies or stellar birth clouds. And off to the far right side, swinging into view now, the star they had come to visit, far enough away to be just the brightest of all the stars.

“You have fourteen new messages,” her circlet said. “Your outgoing messages have been sent and delivery acknowledged.”

“I’m going home,” she said to Seeüwit. “I’ve got messages to read.”

“Me too,” ze said. “I’ll see you tomorrow morning.”

Message from Nicolás Romero to Emma Fuji

Given her recent work, Emma couldn’t help checking the routing labels of Nicolás’s message before she read the text.

- 1: Periwinkle Monitor terminal 1347 deck 2 (Human habitat)
<Perseus Arm coordinates>
21 March 521 AC, 23:16:44.560071986
- 2: Periwinkle Monitor Nexus node 26790
<Perseus Arm coordinates>
21 March 521 AC, 23:16:44.560152509
- 3: Periwinkle Monitor Nexus outgoing queue
<Perseus Arm coordinates>
21 March 521 AC, 23:16: 44.560152510
- 4: Central Dispatch incoming queue
<Extreme Outer Arm coordinates>
21 March 521 AC, 23:16: 44.560152511
- 5: Central Dispatch pending queue
<Extreme Outer Arm coordinates>
21 March 521 AC, 23:16: 44.560152513
- 6: Central Dispatch outgoing queue
<Extreme Outer Arm coordinates>
26 March 521 AC, 20:05:19.308818372
- 7: Violet Enforcer Nexus incoming queue
<Sagittarius Arm coordinates>
26 March 521 AC, 20:05:19.308818373
- 8: Violet Enforcer Nexus node 6514
<Sagittarius Arm coordinates>
26 March 521 AC, 20:05:19.308818373
- 9: Violet Enforcer terminal 413035 deck 2 (Human habitat)
<Sagittarius Arm coordinates>
26 March 521 AC, 20:05:19.314052362

Emma my sweet, I can’t believe it’s going to be over two weeks before I can even hear your voice again. I just checked the ship schedules, and it could be another year before we’re in the same place in the same universe at the same time. How am I going to survive that?

These past five days have been some of the most intense of my life, and I’m not just talking about the hiking -- by the way, do you ever do anything at less than 100%? I loved the food you cooked for all of us that night, and your inspired tagging, and what happened after the others left us alone. I’m a little surprised I was able to walk back onto Periwinkle under my own power.

You’re my ideal woman, beautiful, smart, funny -- and not too tall -- and I would be a wasted fool if I didn’t do something about it. I’m going to start researching whether Concord will allow a second Human on Violet. They might be more inclined to agree if we were married. What do you think? I’ll give you until our next twitch to mull that over.

Well, you're already in the bubble by now and we're heading there soon, and I want to be sure this gets out so you'll have it when you translate back. And I need some sleep, you vixen. I will speak to you as soon as the laws of this wasted universe allow me to. I love you.

Nicolás

Interview #18 with Human Emma Fuji

1 January 520 AC (2633 AD)

7/5/307,597,922/50

- S: Some Humans still cling to pre-Contact myths about the origin of the universe and of Humans themselves.
- E: Yes, some do. I think most people have given those up as childish, but there are still fairly large groups that believe in a god of some kind. All the Renouncers, for example.
- S: We'll discuss the Renouncers another time. Tell me about Human religions.
- E: To do that subject justice would take a really long time. But you can make generalizations. I think there are, ah, maybe four major types. The animists believed that everything in nature has a spirit: wind, trees, horses, people. Polytheists imagined a pantheon of gods that were like Humans but on a larger scale, each with his own unique attributes, strengths and weaknesses. Monotheists believed there was one supreme god, also an oversized Human, who created everything; most of them also believed that their god was personally involved in their lives, and cared what they did, and would punish or reward them after death. And the rest are rather harder to summarize; some were called religions but were really more like philosophies, some sought to attain oneness with the universe with or without invoking gods.
- S: It seems to me that Humans do not tend to agree on much. You had thousands of languages, hundreds of nations, uncounted religions. Each group went its own way.
- E: Yes, unless they were evangelizing. Which they often did. At some point in their history, two of the three monotheistic religions had followers who believed that everyone should believe exactly the same thing they did, and anyone who refused should be killed.
- S: *[Long pause.]* When an entire Tribe acts like that, we call them Killers and we eradicate them.
- E: I know.
- S: So what has replaced this, in the people who have given up the old myths?
- E: Well... Concord. We're five hundred years into our ten thousand year probation, and most of the people I know on Earth—and even more so on *Periwinkle*—are trying to make sure that we pass that test and reach Level two. They want Rhea.
- S: Naturally. But apparently some groups have just transferred their superstitions from unknown invisible beings in the sky to Concord invisible beings in the sky.
- E: Of course. I know that, on every metric you can name, there's a large variation between the forty-four active Tribes in Concord. We're still young, so we still have that variation *within* our Tribe. We're not used to being united yet—actually, I guess you could say that we're *not* fully united yet, due to the Renouncers. Hmm. Well... it was inevitable that some people, at least, would treat an astoundingly ancient and peaceful civilization, with incredible powers and long-lived individuals, as the gods they'd been searching for for ages. They'll grow out of it.
- S: That's your prediction, then? That the Concord-worshippers and the Renouncers will just wither away?
- E: Yes, and long before our probation is up. That's my belief. The Renouncer population has gotten smaller every year since Contact.
- S: Hmm.
- E: So... may I ask a question?

- S: Of course.
- E: Are there any other Tribes that believe in a supernatural being or creator?
- S: No.
- E: Really? Not one?
- S: No Level two Tribe has *ever* held such a belief, although many did so earlier in their history. There *are* civilizations in the galaxy that believe these things, but they're all Hermits—or Killers that were extirpated.
- E: But you don't know where the universes came from. Personally, I'm okay with just admitting that no one knows why there's something rather than nothing, but a lot of people can't leave it at that.
- S: We know for a fact that the universes we can reach with the bubble drive were all created at the same time by someone or something. They did not arise spontaneously or by some continuously-expanding entropy mechanism, like your old eternal inflation idea.
- E: But you don't know who did it, or what's outside.
- S: I've seen compelling arguments that if we could get outside our bubble we would be able to figure out how the universes were created, and would likely be able to determine who did it, and perhaps even why. But I've also seen nearly irrefutable proof that it's not possible to leave a 3+1 universe except to travel to a sibling 3+1 universe. It simply can't be done. So we will never know.
- E: And that's why Humans invented religions, you know.

Weeding

Concord loved to categorize things. They recognized eight types of planets or Tribes, ranging from Prebiotic to Member, and twelve Levels of Concord membership, ranging from Probation (Earth was the only Probation Tribe) to Director (the Aashaa, of which their captain was a member, was the only Director Tribe).

Emma did not expect ever to see a Killer Tribe. They didn't last long. Concord monitored every star and every planet in the galaxy, mostly using drone buoys. When a Tribe managed to leave their home system, they were greeted by a Contact ship, which was always backed up by an Enforcer, and invited to join. One of the requirements of membership was that you agreed not to eat, enslave, or make war on any other Tribe. In the long history of Concord, exactly 379 Tribes had refused to abide by that rule. The Contact ship explained the consequences, but some Tribes were just too stupid to understand what it meant to defy an organization that had survived for seven billion years and four mergers with smaller galaxies. Not one of the Killers had survived more than an hour after their last-chance offer.

The next step down in awfulness was a Weed. Weeds were Tribes that would not stay contained within their own system, but spread to neighboring systems, infected them (historically wiping out any indigenous life, though this had not happened for ages), and then spread again. Emma had learned in her studies that Weeds were not typically intelligent species. Intelligent Tribes with Weed tendencies had so far always become Killers and been destroyed.

Part of the job of Enforcers was to trim Weed outbreaks. Because Weeds could not be informed that they were breaking the rules, Concord did not just eradicate them as they did with Killers. They simply quarantined them in their own system, and cut them back when they got too close to leaving their star. There was always the possibility, cherished in Concord although it had never happened yet, that a Weed Tribe would evolve an intelligent non-Killer species.

Weeds tended not to last too long either. Locked up in their own system, they eventually withered and died. Of the 985 Weed Tribes that Concord had record of, only three were still alive.

This one, far out in the Sagittarius Arm, was particularly aggressive. *Violet's* logs showed that they'd had to trim it back only three years ago.

Emma watched the operation from the display in her office. There were several billion buoys in this star system, almost all of them manufactured in automated factories from local materials in the outer reaches of the system. So they knew just where to find the Weeds that were trying to escape.

The star was young and bluish-white. It had seven planets, four gas giants with about sixty moons between them, and three rocky worlds with four moons altogether. There were also two asteroid belts and the usual collection of frozen garbage far out from the star. Every solid body, and many layers of the gas giant atmospheres, were crawling with spiky crystalline things that looked like giant diatoms with rat tails.

Emma split her screen to show the view from the ship's hull on one side (still showing the star as just a very bright spot), and the ongoing logistics discussions between the living experts and Nexus on the other. The debate consisted of audio translations, schematics, text messages, scatter charts and histograms, navigational plots, and overlays that showed where the Weed clusters were located in the system. The information scrolled by too fast to follow.

It took several hours for the flow of data to slow down and coalesce into consensus. Nexus handled all navigation other than translation, so when they all agreed on the plan of operations, the ship started moving.

There were several thousand of the spiky things spreading out in a single squirt into the comet cloud on this side of the star, which is why *Violet* had arrived in this particular place. Emma couldn't determine whether the Weeds were plants or animals, and after skimming the file on the organisms she decided they were neither. It was an utterly alien biology, but apparently not unprecedented. The file contained references for nine similar species known to Concord in the past.

As *Violet* accelerated there was no visible change in the distant stars, but the relative position of the local star drifted to the right. The discussion pane on her display was replaced with a target list in elimination order, with position and relative velocity for each target. Emma started scrolling down through the list and realized it was nearly endless.

"How many are there?" she asked Nexus.

"Just over two billion free-floating individual targets," it said, "and 944 planetoids with an unknown number of individuals on them."

She clucked in surprise. "You have to do this every three years?"

"No. The Captain decided we should be more thorough this time so we don't have to keep coming back."

They reached the tip of the squirt in about fifteen minutes. By then *Violet* had built up an impressive velocity. When the first diatom was eliminated there was nothing but a very brief flash of white light in her display of the star field, and the target list scrolled up one notch. A few seconds later there was another flash, then three at once, then another singleton, then over ten, and then it was like an enormous field of fireflies out there and the target list was scrolling too fast to read. It went on and on, impressive and boring at the same time. Emma opened two more screens, one to show the ship's path, which was displayed as a red line spiraling in toward the sun, and another to get back to work on her project.

"Let me know when we get close to the first planetoid," she said.

"It will be another half hour," Nexus replied.

A few hours after they translated back to their own universe, new information had started arriving in response to her queries. She was trying to incorporate this into her plot of the route the bait message had taken. The data consisted of verified position and time stamps for the questionable routing labels. The flashing of dying spiky things was distracting, but she couldn't make herself turn it off.

"Nearing the first planetoid," Nexus said.

Emma looked up at the space display. They were far enough away that she couldn't see the rock; but they were also traveling at one or two percent of lightspeed, so she probably wouldn't have been able to see it even if they were closer. The dying fireflies had not abated; if anything they were thicker than they'd been before. She asked Nexus to zoom in on the big target. The display showed a pitted, irregular

rock that looked like one of Mars's moons. It zoomed in even further to show that the surface was covered with a seething mass of the squirming diatoms. Then the view zoomed back out and suddenly the potato-like rock was shining—and then it was gone, replaced by a diffuse cloud of gently glowing gas which faded in seconds to invisibility.

That was enough for her. She told Nexus to shut down all the displays except her project and she resumed her attempts to fit the puzzle pieces into a coherent pattern, trying to ignore the queasy feeling in her stomach.

Lost Buoys

The weeding took three days. When it was done there were no organisms outside the orbit of the last rocky planet. Emma couldn't shake the feeling that it was some kind of mass murder, so she asked Seeüwit about it.

"The only other alternative," ze said, "is to sterilize the entire system. We know this kind of Tribe quite well; they're extremely aggressive. They would spread spores throughout the local arm. In a few thousand or million years, one of them would drift to the planet of another star, and unless there was an advanced technological civilization there, that entire system of worlds would be consumed." Ze paused and zis tsheef ruffled. "If that world had been Earth before Contact, you would not have survived. The weeding we did was the equivalent of trimming your fingernails. These Weeds are not sentient as you understand the term, and there was no pain."

"Okay," she said. "I understand that it was for the common good. It was just hard to watch."

"Good. If you had enjoyed it, I would worry about you and your Tribe."

She smiled weakly.

"Now," ze said, "how is your project going?"

"I think it's done. Nexus, bring up the routing map."

The display above her desk lit up, showing an oblique view of the galaxy with the Magellanic clouds off to the right and the outer stretch of the Perseus Arm in the foreground. A pulsing pair of dots, one purple and one blue, were right next to each other in Perseus.

From the paired ships, a vivid green line shot out into the galaxy, bouncing off various places, some closer and some farther from the core. Some segments of the line were red, indicating that the labels were missing or untrustworthy, but about two-thirds of the segments were the original green. The line came back to the ships many times, and ended up right where it began.

"It originated on *Violet*," Emma said, "during the time that *Periwinkle* was docked with us. Some of the legs are certainly false, but we've recovered enough to be sure the message came from here."

"Where specifically?"

"Nexus?"

A schematic of *Violet* appeared and their point of view zoomed in to deck three. It kept zooming in and finally stopped in a park, then the schematic was replaced with a real-time camera feed. It was a rock garden that Emma had never visited, well around the circumference from her office building, with enormous standing stones and several large labyrinths composed entirely of boulders taller than her cottage. The terminal that had been used to send the message was in the center of one of the labyrinths, so it would be shielded from view except from above.

"Nexus," Seeüwit said, "is there a record of who used that terminal when the message was sent?"

"I've searched," it replied. "As you know, I don't keep constant visual surveillance on any part of the ship. Although I am constantly monitoring for distress calls, recordings are made only in emergencies or other rare occasions when something is wrong." Emma guessed it meant when someone was fighting, which was *very* rare. "There are no recordings available of that place and time."

"Any idea who might have sent the message?"

"None. Whoever it was, they did not need assistance, so I was not involved."

Nexus and its multitasking abilities were enormous, but the ship was even more so. Unless directly called upon, Nexus did not interact with people going about their business.

“So,” Emma said, “the perpetrator sent the message while we were docked with *Periwinkle*, they did it in a private place right out in public, made sure they would not be monitored, and they went to enormous effort to prevent us from finding out where it came from.”

“But you did find it. It was difficult but not impossible. That suggests that either they wanted you to find it eventually, or that they were not capable of hiding their tracks any better than they did.”

“Or that they didn’t think we’d bother.”

Seeüwit ruffled in amusement. “You are rather tenacious.”

“They tried to kill me!” Emma sat back and waved her hand, and the display vanished.

“Nexus,” Seeüwit said, “post this report. Now, Emma... well done. Since you’re finished, I suggest that we call it a day and go for a walk in your woods.”

“Okay,” she said. This was something new; ze had visited her habitat many times but never proposed going for a walk before. “I think Moondog would love that.”

* * *

“You have some waterfalls nearby, I believe,” Seeüwit said as they left the transport near her cottage.

“Yes, upstream from the lake.”

They walked down the path to her house. The trees seemed to be turning more golden every day. When she opened the door Moondog bounded out, running around them both and yelping. Emma reached in to grab Moondog’s favorite rubber ball from the table by her front door. As she was turning around, Seeüwit dropped into quadruped mode, with zis fifth arm sticking up like a weird antenna, and raced Moondog up and away from the house. They vanished into the trees. A moment later the Thweett returned, in biped mode, without the dog.

“She’s blazing a trail for us,” ze said. “Shall we follow?”

They strolled after Moondog. “Who won the race?” Emma said.

“Moondog always wins.”

“Is that because she’s faster or because you let her win?”

“It seems polite not to disappoint her.”

Emma laughed. “Come on, tell me. If you raced her flat out, who would win?”

“It’s a difficult question,” ze said, ruffling zis tsheef in a pattern Emma had never seen before. “I’m larger, with much longer limbs, but also quite a bit older personally. Yet I belong to a more advanced and more experienced species, honed by billions of years of evolution to pinnacles of excellence that your young Tribe can only aspire to.”

“So Moondog would leave you in the dust.”

This time she recognized the pattern: laughter. “Yes, I’m afraid so.”

The trail branched off from her ridge-running path and headed uphill. The air was cool, and only patches of afternoon light spilled through the trees. In a month or so there would probably be very few leaves left on them. Emma had found it disconcerting at first that the seasons weren’t in sync with the calendar. They’d told her that when this habitat had been created, they had aligned the seasons to Earth’s northern hemisphere, but *Violet* had spent enough time at relativistic speeds over the centuries that the calendar had drifted. If she waited long enough—actually if her descendants or successors did—it would get back in harmony again. Briefly.

“Pardon me for saying it this way,” Seeüwit said, “but despite the fact that I find your native environment quite alien and bizarre, it’s also very beautiful.”

“Hmm. Thank you, I think.”

After a few kilometers they came to a clear, fast-running river, and the trail turned to follow it upstream. Emma saw a pair of river otters spiraling through the water and pointed them out to Seeüwit.

“I got a message from Nicolás just before they translated,” she said.

“That was nice of him.”

“He suggested that we might get married.”

Seeüwit stopped. A Human would have turned to face her, but one eye was already pointed right at her. “I wondered what’s been distracting you the last few days.”

“Well, it was that and the weeding. And finishing the bait trail.”

“But mostly…”

“Yes.” They resumed their walk.

“Is that a good thing?”

“I think it is. No, I know it is. If they let us stay together.”

“I don’t think there’s any question of that. There were very good reasons to start with just one Human on this ship, but those purposes would not be deflected by having a mated pair instead.”

“Well, that’s good to know.”

“So your answer will be yes?”

She didn’t respond until they had reached the lowest waterfall a few minutes later. It was about a two-meter fall over huge rocks. She had to raise her voice a little over the noise. “Yes. I love him and I miss him horribly when we’re separated. Something in me doesn’t want this experience on *Violet* to change, but I can’t see how it would be anything but better if we got married, and lived and worked together here.”

They stood watching the water cascade over the rocks. Moondog popped out of the underbrush beside Emma and lay down, panting, watching with them. After a while Emma led the way up the steep hill beside the waterfall and they walked another half kilometer to the biggest fall on this part of river, which was over ten meters high. The water crashed and foamed on the rocky river bed where it had dug out a wide and deep pool. The noise was loud enough to make talking not worth the effort, so they didn’t try.

Once again Emma led the way. The trail wound away from the river for a bit to find a gentler slope. They came out of the woods into a meadow alongside a lake upstream from the falls. This one wasn’t as big as the lake by her cottage, but still it was much more than a stone’s throw across. Emma took the rubber ball out of her pocket and waggled it. Moondog stood on her hind legs and yelped excitedly. Emma threw the ball and the dog rocketed off after it, disappearing into the tall grasses.

“Something odd has happened,” Seeüwit said.

Emma looked at zim. She expected she was about to hear the real reason for this unusual outing. Moondog reappeared with the ball, somehow managing to grin around it, and Emma threw it again; the dog vanished back into the grasses.

“Some monitor buoys in three different star systems have failed.”

“Why is that unusual? There are usually millions to billions of them in any given system, right? I’d imagine they’d be failing all the time.”

“Not really. They’re extremely durable, capable of maneuvering to avoid collisions, and they’re programmed to keep their distance from any native life. We lose around seventy every year in the whole galaxy. These three systems have each lost most of their monitors within a short time span.”

Her heart skipped a beat. “More sabotage?”

“It looks that way. Central Dispatch has completed an analysis and the times of failure seem to be compatible with a speed-of-light signal emanating from a single point in each system.”

“So, either a disabling message or a killer beam.”

“Yes.”

“What are we going to do about it?”

“We’re going to go investigate. You may not realize it, but this apparently-coordinated attack is unprecedented in Concord history.”

Moondog returned the ball and Emma threw it again.

“It’s just another opportunity to gather more data,” she said. “Maybe enough to find these wasters and put them down.”

Presapient

It took a little less than two days to reach the closest sabotaged system. It was an unusual solar system in that it had only two planets: a super-Jupiter close to the sun and an Earth-like world farther out. The system was classified as Presapient, meaning that it had complex life but no intelligence.

Emma watched the translation from the Pilot’s Lounge with Seeüwit, but this time they were joined only by her Pilot acquaintance Kee 9. Ze climbed up onto an ottoman that looked like a boulder—it might have actually been a boulder—turned sideways to the viewing screen, and pointed both heads toward the screen. One head protruded from the horns at each end of the domed and baroquely-horned shell. The heads were just for eating and sensory apparatus; the large brain was safely housed deep inside the armor. When Emma had been a girl her mother had read her a book about a doctor who could talk to animals, and he knew an animal with a head on each end. The Pilots were a tortoise-like version of that creature.

“Emma,” Kee 9 said via her twitcher, “I viewed your report on the bait message. Nicely done.”

“Thank you, Kee 9,” she said.

One of zis heads swiveled to look at her. “We will have a report on the other sabotage in a few days. I’d like you and Seeüwit to come to the meeting where the results will be reported. We will consolidate the information from all three and see if we can draw any conclusions.”

“Thank you, that’s very gratifying. I’m very interested to hear the results.”

Ze scuttled in place for a moment. Her twitcher informed her that this was a sign of amusement.

“So would I be if someone had tried to kill *me*.”

“That’s hard to imagine,” Emma said. “Everyone knows the consequences of killing a Pilot.”

“Yet someone tried just that. If the plan had succeeded, that bomb on the inertia exchanger would have killed me and my entire clan a few days after you died from your suit malfunction.”

She felt stupid for having forgotten that. “Sorry,” she muttered.

“No need to be. I understand a little of what you’ve been through, and I admire how well you’ve persevered with no one of your own Tribe to comfort you. *That* I cannot imagine. I’ve never been out of touch with my clan in my whole life.”

She wondered how long that had been. Pilots were essentially immortal. There were none living that personally remembered their old friends the Founders, who had been extinct since before life arose on Earth. But Seeüwit had told her once that you only had to go back seven generations to find Pilots who had known Founders personally. In Human terms, it was as if people living in the twentieth century had witnessed the Big Bang.

“We will notify you when the meeting has been scheduled,” Kee 9 said. Ze turned back to the screen.

“Two minutes,” her cirlet said.

“Have you checked your numbers lately?” Seeüwit asked.

“No, I’ve been too busy.”

“More than half of the ship’s population watched the last interview live. Almost all the rest have viewed the recording at least once.”

She felt herself blushing.

“Interesting physiological reaction,” Seeüwit said, ruffling in amusement, and turned to watch the screen.

The blackness blazed red to white and faded almost before her eyes could register it. They were fairly close to a golden-yellow star, probably inside the orbit of Earth if this had been Sol. Half of the screen was taken up by the curve of a planet dominated by blue-green oceans that were scattered with

puffy clouds. On Earth she would have expected to see at least one cyclone, but none were visible here. There were uncountable islands scattered in distinct arcs, but no major land masses.

“You have three new messages,” her cirplet said. Emma checked if any were from Nicolás, even though she knew it was still almost a week before he translated back home. One was from her parents, two from friends.

“What’s the plan here?” she asked Seeūwit.

“We’ll scan the planet to be sure it hasn’t been tampered with. Try to collect some damaged buoys if we can find any. And seed some new buoy factories to replace the lost monitors.”

“That sounds intensely boring. I’m heading back home.”

“Give Moondog a belly rub for me.”

“Will do. Goodbye, Zee 9.”

“I will see you soon, Emma,” the Pilot said without moving.

* * *

Back home Emma reheated the second half of a casserole she’d made a few days earlier. She ate on the back patio with Moondog at her feet, the dog’s ears twitching for the sound of dropped food, and watched the sun go down. She knew it wasn’t really the sun, just a brilliant spot of illumination that travelled across the roof of her habitat to give the illusion of a normal day/night cycle. But the illusion was so effective that she often forgot she wasn’t on the surface of a planet—she was sitting on the middle shell of a layered, moon-sized spaceship.

That was the idea, of course. The plants and animals that shared the habitat with her—whose presence made it bearable to live here alone so far way from the rest of her people—had no idea they were on a spaceship. The illusion was as much for them as for her.

When the daylight had faded to dusk she carried her dishes into the kitchen and tossed them in the cleaner.

“Hey, Moondog,” she said, “let’s go tagging.”

The dog yelped once in joy; anything Emma wanted to do was okay with her, as long as they did it together. They left the cottage, headed toward the transport station, then past it. The rocky outcropping that hid the station tailed out into a low ridge of boulders among which trees grew here and there. A few minutes’ walk past the station, the ridge rose again and became a cliff face with a little talus slope at its foot.

As she went on the cliff became less and less rugged. At its start it would be a good climbing face, though she’d never tried it, with lots of hand- and footholds. But then the bare rock became smoother and not quite as tall. It never quite reached the smoothness of a wall, more like very rough concrete, but it looked like fine-grained sandstone.

Which it wasn’t, of course. The infrastructure of the habitat had been built using one of the industrial-sized fabricators and moved into place with giant automated earthmoving machines. Someone had sculpted the raw materials into a landscape; someday she would like to know who that had been. It was obviously someone who had studied Earth’s landforms. When the rough grade was done they had manufactured soil, imported a microbiome from Earth, then plants, and finally animals. Right now, to the east of her habitat, an extension five times the size of the original was ripening. They had told her it would be ready to open up to this one in a century or so. When they were done, the Human habitat would be comparable in size to several others on the ship—about the size of all the British islands put together.

Hidden within this “natural” world they had made were some truly unnatural things, such as this cliff.

The entire cliff face was covered with sprayed-on paintings. On the last full day that Nicolás and his friends from *Periwinkle* had visited with her, they’d spent the day painting this surface. On the far right were the intensely convoluted, nested spirals that Suyi had made. They bled gradually into the stark, angular forms Mark specialized in, which then merged with Azadeh’s curving, intricate geometries. And

those merged into the dreamy, nebulous shapes that Nicolás had painted; almost looking as if they were representational, but you could never quite pin down just what they were meant to represent. Her own bloated, flowing shapes looked childish in comparison, but the others had praised them over her protests.

Emma stood for a while in the twilight studying the mural they'd made. Meanwhile Moondog curled up on the ground with her tail over her nose and watched her.

"Lights up," she said, and the cliff face was illuminated as if it were noon. "Dimmer, please." The light scaled back to what it had been perhaps half an hour ago. "Record and erase." The paint fell off the rock face as dust, as the surface repelled it. There was a momentary sucking sound as the cleaning system vacuumed the paint dust away to be recycled.

Emma walked to an enormous standing stone twenty meters back from the cliff. She opened the panel in its back side and took out a spray gun. She dialed for navy blue, medium spray, and made a first sweeping arc, rising from left to right.

* * *

The next morning she spent some time reviewing the local lifeforms. She had studied xenobiology at university as part of her comprehensive Concord studies and knew roughly what to expect from an Earth-like world.

Out of the trillions of planets in the galaxy, about one in a thousand had life of any kind. The vast majority of living planets had nothing but single-celled microscopic analogues of bacteria, and most of them stayed that way forever. They never evolved multicellular life, let alone intelligence. Concord left these worlds strictly alone for at least three billion years to give them a chance to do more. (Earth had stayed at that stage for well over two billion years.) If after that time nothing else had happened, the planet was a candidate for terraforming if needed. But Concord believed in slow, restricted colonization by its Members, so very few planets were converted. The Pilots, who had been at it longer than any other Tribe, reputedly only owned fifteen worlds.

Fewer than one out of a million Prokaryotic worlds developed complex life. There were currently just over a thousand Presapient planets. Concord watched these very closely: Monitor ships stopped by regularly, and the systems were heavily seeded with monitor buoys to ensure there was no interference and to wait for signs of intelligence.

Far less than one percent of Presapient planets ever developed intelligent, tool-using creatures. There were now just five of these Candidates being observed by Concord. Until half a millennium ago, Earth had been the sixth. Monitor ships stopped by frequently, and the systems were even more heavily observed by automated buoys.

When an intelligent Tribe left their solar system, Concord invited them to join the community. Most declined, preferring to stay in their home system rather than deal with aliens. It was astonishing yet commonplace that almost every Tribe concluded that, having never heard from any other civilization, they must either be alone in the galaxy, or be the first on the scene. Emma had been startled to learn that the xenophobic traits Humans had exhibited throughout their history were not only widespread, but were more common than not. There were sixty-one so-called Hermit Tribes, who had elected not to join, compared to forty-four Member Tribes. Member Tribes tended to last longer, so those numbers were even more skewed than they looked, because there was a lot of churn in the Hermits. Only a quarter of the Member Tribes had been in Concord for less than a million years. Hermits tended to last two million years or less, while the average lifetime of a Member Tribe was two-thirds of a *billion* years.

There was another way to join Concord, of course, the one that Earth had foolishly, unwittingly chosen: ruin your planet and bring yourself to the brink of extinction. Then Concord would ask politely if you really meant to do that. Most such Tribes told them to get lost and went on to finish the job. Humans had been the first in a long time to ask for help instead of trying to kill the ambassadors.

The local biota here was, as ever, unique in its combination of features without any truly new innovations. Life was chemistry; there were only so many ways of combining atoms, and all of them had been tried in the first few billion years of the Milky Way's history.

So the planet had a universal molecule that transmitted genetic information, although it was not DNA. There were things like plants that captured solar radiation with a molecule more efficient than chlorophyll. There were things like animals, which consumed the plants and each other. There was sexual reproduction, and like most living organisms in the galaxy they accomplished that without having distinct sexes. (Humans, Aashaas, and Kchiks were rare in having multiple sexes, although no one knew how many sexes the Kchiks had, and they refused to discuss it.) And, as on every living world ever found, the vast bulk of both the individuals and biomass on this planet was made up of single-celled organisms.

The creatures in the ocean looked a lot like fishes. The flyers looked a lot like small crestless pterodactyls. The land animals ranged from tiny insect-analogues, all with eight legs, to dog-sized, bare-skinned, pointy-faced howlers, also all with eight legs. Nowhere on this planet was there a subdivision into herbivores and carnivores; anything with a mouth would eat anything else.

And nothing on the whole planet to talk to. Emma found it vaguely depressing.

Message from Freya Grey to Emma Fuji

My dearest Emma,

Your father was in the middle of digging out a new vegetable garden back where the massive old oak tree used to be, before it was hit by lightning in that vicious storm the year you graduated from University, when another crisis broke out in central Africa and he was called away. He left explicit instructions for how I was to finish the work, but I confess I am at a loss for which end of a shovel goes in the dirt. I was always better with a scalpel than a trowel, but I'm trying. He'll be back in a week or so to complain about my lack of progress. Fortunately, I am much better at handling your father than I am at tilling, so I expect the outburst will be short-lived.

I delivered two new babies in Aberlour in just the last month. I think that brings the population up to 213, once your father returns. The town is growing again, after centuries of decline. Someone bought up another row of decrepit houses near the square, on the old parade route, and a crew of grinning, singing, shirtless Irish swells is knocking it to the ground. I suppose a charming traditional cottage with stunning gardens will go in its place, and that's progress, if you like that sort of thing. Oh wait, I just remembered: you do.

I seem to have bruised my hip somehow. Not working on that infernal garden, I'm sure of that. I can walk all right, but it hurts going up the stairs, so I'm staying out of your old rooms for a while. You'll just have to deal with the dust yourself when you visit next.

Oh, another piece of construction news you will be happy to hear. The Senate has voted funds to rebuild the bridge at Craigellachie. I remember you wrote a history of the musty old thing when you were in public school. And you were always walking down there and scrambling about the ruins like a monkey with no tail, despite all my warnings. I suppose it's some kind of miracle you were never crushed, but you always were lucky that way.

Ah, the shortbread is done -- the old recipe, you know the one -- and it's teatime. I wish you were here to share it, but I'm not going to wait for you to enjoy some myself. Let me know how you're getting on with that old five-legged friend of yours (have I warned you not to trust zim too much?), and give my love to Nicolás when you see him next.

Freya

Hermit

Emma saw on her favorite news channel—the only one translated into Napien, which meant that she was probably the only person on the ship watching it—that they had recovered more than a few of the damaged buoys, more or less intact, and that investigators were taking them apart down to the atomic level. Stay tuned for updates. The report was narrated by a Thweett, who was probably doing the news as a hobby. It occurred to her that it was possible ze was actually *speaking* Napien, not being translated, but since Thweetts spoke with the same tympanums they used to hear with, it was impossible to tell. There were no lips to read.

Two days after arriving at the first problem system, they translated into the second. They were so far away from the red dwarf sun that it was hard to tell it from the distant stars. The view screen showed a schematic of more than a dozen planets, half of them gas giants, and too many moons to bother counting. Every rocky planet and all the larger moons were inhabited; most had been terraformed, but a few were so encrusted with habitat bubbles that it looked like someone had dropped a giant bar of soap into a fizzy ocean. The system was swarming with spacecraft, so Concord's presence was limited to the outer reaches of the comet halo.

This was a Hermit system, home to an obviously vigorous race that had declined Membership in Concord. This time she and Seeüwit were alone in their alcove of the Pilot's Lounge.

"Don't you find it disheartening when a Tribe refuses to join?" she asked zim.

"No. It's normal. Rejection has happened too many times, and it's happened more often than acceptance, to take it personally." Ze leaned in and seemed to be examining her. "Are you all right?"

"I'm okay. I'm just feeling sad."

"Why?"

"I don't think anyone ever really knows why they feel depressed; it's probably just chemical. But you want a list? We still have no idea who tried to kill me, no idea who committed the other sabotage, Mother sent me another one of her weird messages, and I'm lonely. And that Presapient system got to me for some reason. Not to mention this one."

"What do you mean?"

"There are what—billions, trillions?—of these Hermits living in this system, and we will never get to know them. We can study them from a distance, see their works and maybe learn some of their language, but we'll never be friends. They can't help us and we can't help them."

"Okay. What about the Presapients?"

"I don't know. Universal omnivorousness. It's creepy. Nowhere a peaceful rabbit just minding its own business eating clover. No magnificent lion at the top of the food chain. Just everybody trying to eat everybody else."

"That system is as common as any other, and it has its own beauty." She shrugged. "You really are depressed. Tell me about your mother's message."

"Nothing special. Dad went off on another relief mission to Africa. Some local news." She looked at zim and wondered if she was being foolhardy, but decided that if she really couldn't trust Seeüwit she might as well walk out the airlock without a suit. "She told me not to trust you too much."

Ze dropped to quadruped mode; zis tsheef rippled violently, and ze chirped and whistled so loudly that Thweetts down on the floor looked up at zim. Seeüwit waved and clicked at them, and they turned away.

"She remembered," ze said when the fit of laughter had subsided.

"Remembered what?"

"I was stationed on *Periwinkle* the whole time your mother worked on that ship."

Emma gasped in surprise. "She never told me that."

"Freya applied to join the crew when she was quite young, but it was several years before she was accepted. While she was waiting she met and married your father. When she got her posting, we offered to let him come too, but he wasn't willing to leave Earth. He urged her to go anyway, and she did—

reluctantly, I think. They saw each other a few times a year, and on one of their last, ah, conjugal visits she got pregnant with you.”

“I’ve never heard any of this before.”

“Your mother resigned from the ship when she realized she was pregnant. Not because it was dangerous, of course, but because she wanted to raise you with your father. But it was several months before *Periwinkle* could get back to Earth to let her off. By the time she could leave, she was rather huge.”

“What, like...”

“Almost ready to deliver. Freya and I had a different kind of relationship than you and I have. She’s not quite as... Hmm. I don’t want to insult either of you.”

“You mean she can be a real pain in the ass.”

“And you, my dear, are very sweet. Tough, but nice. Whereas I would say your mother is tough but good. Very different.”

“What are you trying to tell me?”

“Practical jokes.”

She snorted. “*What!* You mean—you and my mother?”

“Constantly. For seven years. When she told me she was going back home, I did a lot research because I wanted to do something really special for her departure. On your mother’s last night aboard I revived an ancient Earth custom.”

“What?”

“Short sheeting.”

Emma burst out laughing. She folded over on herself and guffawed. Tears were running down her face as she imagined her mother—massively pregnant, tired, with a backache, probably cranky—trying to slide into bed and not able to. She’d have had to get back out and remake the bed, and there wouldn’t have been enough time to come up with a suitably vicious response.

Finally she got control of herself and wiped her face with her sleeve.

“She told me that so you would tell me this.”

“That would be just like her. She’s probably also hoping you’ll come up with some prank to pay me back.”

“Not my style.”

“I know. Anyway, it’s not necessary. She had just enough time to rig up a farewell of her own. The next time I took a rest period in my hammock, my weight tripped a lever that triggered a spark that set off a string of firecrackers right beneath me. I think I dented the ceiling.”

“They let her bring *firecrackers* onto *Periwinkle*?” she said incredulously.

“She cooked them up herself in her spare time. An ancient Chinese recipe, I believe she told me later.”

“But she couldn’t have done it that night...”

“She’d been saving them for months. My family let her into our home to do it. After I fell onto the floor it took a minute to get control of myself again. When I looked up, they were all standing there laughing at me. I think they thought we were even.”

Emma chuckled again. Now she had two crazy images floating in her mind.

“Wait,” she said. “So it’s not a coincidence that you’re here, and assigned to be my mentor?”

“Not at all. Your mother is part of the reason you were chosen to be the first Human posted to *Violet*, and my relationship with her was the reason I volunteered to work with you.”

“And you waited two years to tell me?”

“Good stories, like good practical jokes, have to wait for the proper time.”

Emma realized that she was no longer depressed.

* * *

Her mood was sufficiently improved that she felt motivated to research the locals that evening from home. With Moondog lying at her feet and a glass of wine at hand, she activated the terminal in her tiny study upstairs.

Although Concord had no buoys closer to this sun than Pluto was to Earth's, they were capable of coordinating themselves to form an interferometer that mimicked a telescope the diameter of the solar system. When focused inward, this virtual telescope could resolve individuals on the surface of their home world, the second out from the sun.

At least, the buoys had been capable of that before someone wiped out half of them.

Nexus showed her a file on the Hermit anatomy. Their bodies looked like large, tight bundles of reeds held together with rough twine. There were no obvious sensory organs or limbs. Video from the Contact meeting at which they declined Membership showed that many of the reed-like structures could partially detach from the bundle and operate as arms.

Emma had studied all forty-three of the non-Human Tribes in Concord and these creatures were completely unlike anything else she had ever heard of.

"Is this a unique anatomy?" she asked Nexus.

"Not completely," it said. "I have two similar species on record, both also Hermits, that lived 1.3 billion years ago and 5.9 billion years ago."

She had a thought. "Hey, is Human anatomy unique?"

"No. There have been similar Tribes at various times in history. Some were Members, some were Hermits. One was a Killer."

"How many total?"

There was an odd delay before Nexus answered, "Six."

"Can you show me what they looked like?"

The floating display showed an overlapping stack of rotating images. Emma gestured to spread them out. The creatures were indeed similar to Humans, but each was different enough that she would never have mistaken them for people from Earth. One's arms were too long, one had numerous short horns protruding from its bald head, another was light green and its feet were much too large, another had no nose and eyes set so far apart that it couldn't have had binocular vision. But the basic body pattern was the same as Humans: bipedal, upright, tailless, two hands, two eyes. They looked much more like Humans than any living Member of Concord.

"Okay," she said, swiping the display away. She spent a little more time studying the locals before she turned off the terminal and went to bed.

The next morning she woke to an invitation—effectively a summons—to the meeting the Pilot had told her was coming.

You're not going to like this

Violet was still several days away from the last system of damaged buoys. Emma had thought they—whoever it was running the investigation—would wait until then to go over the results of their studies. But she had discovered that Concord in general did not do things the way Humans did. Their meetings were actually run efficiently, for one thing.

The gathering was scheduled for a few hours after her usual waking time. She had enough leeway for breakfast and a shower, and to let Moondog out, but not enough time for a run. While she was showering she wondered how they scheduled things like this, given that every habitat had its own day/night cycle, completely out of sync with all the others. She supposed that, with an average population of over a hundred thousand per Tribe, it wouldn't be hard to find *someone* who was awake. Then she remembered that most Tribes didn't have to sleep, and wondered if the meeting had been scheduled to suit *her* day.

She took a seat on the bench in the transport. It felt cavernous, as usual: a house-sized, pressurized chamber that could move under its own power in any direction through the vacuum tubes that riddled

every shell. Hers typically carried only her, and though it seemed wasteful it was actually simpler to have a standardized cabin that could be used for any Tribe and any transport station on the ship. And anyway, energy was free.

Seeüwit met her at the transport station on deck three, in an area Emma had never visited before, very close to the Pilots' habitat, which was the only habitat on this deck. It had taken her three times longer to reach than her office in Frongstay.

"Who's going to be there?" she said when they'd got through the usual pleasantries.

"Only Aashaas, Thweetts, and Pilots. And you."

"You don't mean... all of them?"

Seeüwit ruffled in amusement. "All of them may be watching. Only the chief investigators will be present, which is why you're invited, since you investigated the message. And also since you were a target."

"So you were a chief investigator?"

"Ah. I am a special case. I'm here as your mentor, and your friend, since you are young and alone."

"Well, thanks in advance."

"My pleasure."

The conference was to be held in a special meeting place, not far from the transport station. The building Seeüwit led her to was round, with a domed roof, about twice the size of her cottage. It looked somewhat like a large sandstone yurt.

The door was the same tan-colored stone as the walls. Seeüwit pushed it open easily, which was surprising when she saw that it was over a meter thick, just like the walls. Inside the building was a single room with a large, polished obsidian table in its center, round except for cutouts here and there where creatures that did not use chairs could nestle in close. There were various platforms, resting rocks, and chairs around the table, and another ring of them lining the wall.

The room was illuminated a little dimly for Emma's eyes, indirectly in a light ring that ran all the way around the building where the straight walls met the curved, domed ceiling. The warm-tinted beige stone, seamless and unadorned, bounced the light, producing a golden glow almost like an Earthly sunset.

There were already several people present. The Captain was accompanied by three other Aashaas that were all female, based on their brighter plumage. The Captain and one other roosted at the table, the other two behind them at the wall. Emma saw Kee 9 sitting on a rock by the wall, with three other Pilots she didn't know at the table. There was also one Thweett standing in triped mode at the table, with two at the wall.

Seeüwit led her to a seat, a very comfortable high-backed rolling chair upholstered in soft black fabric like chenille. Ze took up station behind her in triped mode.

The others murmured greetings to her; then nothing happened for a moment. Finally two more Thweetts entered and took up places between Emma and the Pilots, across the table from the other Thweett. Then there were nine people sitting at the table, taking up roughly a quarter of the perimeter.

"Meeting convened," the Captain said. He was speaking his native language of whistles and trills, but Emma's twitcher translated it in her head. "Nexus, record in full and broadcast real-time to the three Elder Tribes aboard *Violet*, with a real-time transcription to Central Dispatch and redirect to all other ships."

"Acknowledged," Nexus said in the same language. When Nexus spoke to Emma its voice always sounded fully Human—like a calm, educated, middle-aged man. She wondered if the others heard it in a similar way.

"For security reasons," the Captain continued, "only Tribes Level ten and above were included in the investigations of the recent sabotage, with the addition of Human Emma Fuji for obvious reasons, and therefore only those Tribes are present at this meeting. I want to note for the record that Level ten was an arbitrary cutoff and is not intended as a disparagement or suspicion of the Uk at Level nine. When the

investigation is concluded and the culprits have been dealt with, all proceedings of this meeting and any subsequent ones will be opened to everyone in accordance with Concord policy. Feesh 23 coordinated the overall investigations and will lead the discussion from this point.”

One of the Pilots tilted zis body up from zis resting rock and a single head stuck up over the table top.

“First, allow me to dispense with the ridiculous so we can concentrate on serious issues. My apologies, Emma,” zis head bowed at her, “but one of the things we had to consider was whether you were responsible for all this.”

Emma rocked back in her chair. She glanced around the table and saw that everyone was looking at her.

“This theory survived for about fifteen seconds and was only put forward for completeness. It was immediately clear that, apologies again, you do not have the technical skills to perform the damage, and also had no possible motive. We feel your many interviews with Seeüwit have given us a very clear picture of your estimable character and we know you were not involved.

“Another ridiculous and short-lived theory is that the three acts of sabotage—the fabricator reprogramming, the reentry bomb, and the buoy decimation—are not related. This defies the laws of probability, since nothing like any of these three acts has occurred in over seventeen billion Concord years.” *Six billion Earth years*, her circlet translated.

“Therefore, starting with the premise that these acts are part of a strategy that was not Emma’s, we have some pertinent questions.

“One. Was Emma’s suit malfunction intended to kill her?

“Two. Was the bomb on the inertia exchanger intended to kill *Violet*?

“Three. What does it mean that only *most* of the buoys in each of three systems were destroyed, instead of all of them? This has many supplemental questions.

“And most importantly, four. Who did this?

“Let us begin with Emma herself. Will you describe your researches for us, please?”

Emma took a deep breath. She asked Nexus to bring up the sheaf of routing labels and the map of the bait message’s path. She described how she had determined that some of the labels were false, how she and Nexus had bridged the resulting gaps, that some of them hinted at references to AIs, and her final conclusion that the message had been sent from a labyrinth on deck three while *Periwinkle* was docked with *Violet*, for delivery two days later.

“Could you show us that first ancient symbol again, please?” Feesh 23 asked.

Emma had Nexus enlarge the snowflake glyph.

“Very interesting. This ties into the fabricator sabotage. Wheefent?”

The Thweett immediately to Emma’s right rose up in biped mode. Emma had never met zim before.

“The fabricator software was infected with an exceptionally targeted virus, which was superbly crafted to evade the periodic quality checks and corruption prevention routines. The code was intensely obfuscated, highly convoluted, and distributed among dozens of nodes. My team’s analysis, with decryption help from Nexus, indicates a 70% probability that this code was written by an AI.”

There was a rustling and various noisy exhalations around the table.

“As an aside,” Wheefent said, “we wiped the programs from all fabricators aboard ship and replaced them with the most recent backups.”

“Are you sure,” the Captain said, “that the backups were not also corrupted?”

“Yes. We performed the same kind of analysis on the backups before we installed them. We are absolutely certain that the problem has been erased. The altered code has been stored in an offline software vault for later analysis if needed.”

“And when was the virus delivered?” Feesh 23 said.

Wheefent turned zis head slightly. Emma got the impression that ze was looking directly at her when ze said, “A few hours before the bait message was placed in the queue. While *Periwinkle* was docked with us.”

The Thweett showed examples of the obfuscated code as well as a complex block diagram showing the extent of the infiltration.

“Now the bomb,” Feesh 23 said. “Zeep 4?”

The Pilot on zis left side raised zimsel and extended a head so it was visible.

“The mechanism is rather primitive, if effective, but of unknown manufacture. We had hoped that the isotope ratios would at least give us a hint which section of the galaxy the metals and organics came from, but it’s quite clear from Fless interferometry that both were gleaned from at least three widely separated places on at least two different spiral arms. I can tell you that the bomb would have killed us all if it had detonated, and that no known Tribe has ever built a device exactly in this pattern.”

“Is there at least an analogue?” Feesh 23 asked.

The Pilot looked directly at Emma as ze said slowly, “Statistical analysis of seventy-one characteristics shows that, while it is not precisely like anything ever seen before, it is more like Human designs than anything in current or past Concord history.”

* * *

If a PhD in Concord Studies had taught Emma anything, it was that the phrase “that’s not possible” was nearly meaningless. There were a few things that Concord could not do—read minds, travel into the void between universes, create an AI that didn’t want to be a Hermit—but the range of things they *could* do was well beyond what any pre-Contact age would have called magic. Still... she found the phrase *that’s not possible* repeating over and over in her head during the moments of silence after the indictment of Earth.

“We do not consider this proof,” Zeep 4 said. “At this point it’s merely another interesting fact that may lead to avenues of investigation.”

“Acknowledged,” Feesh 23 said. “What about the bomb placement?”

“That remains a mystery. There is no record, visual or otherwise, of any unauthorized entry to the engineering spaces. However, as you know, the volume in question is over twelve to the seventeenth cubic distance units,” *twenty-seven billion cubic kilometers*, her twitcher translated, “so it’s possible that someone could have slipped in.”

“Very well. Now the buoys. Thoöfa?”

The Thweett who had arrived before Emma rose up in biped mode. “The loss-of-signal times indicate that a lightspeed signal emanating from a single location in each system destroyed the missing buoys. We’ve heard some wild theories about super-lasers and back-door kill switches. Our investigation has proved that none of these is true. The monitors were destroyed by small explosive devices that attached themselves to the buoys—without alarming the buoys, somehow, which we don’t yet understand. The explosives were triggered by a simple radio signal, hence the observed pattern.”

Ze showed an animation of the signal’s propagation in each of the two systems they’d fixed so far.

“What can you tell us about the devices?”

“We recovered fragments of several of them, and three unexploded ones as well, which failed to detonate because they were in the shadow of a planet or moon. They are identical in manufacture to the bomb we discovered aboard *Violet*, although smaller. There’s no question that they were made by the same Tribe, whoever that may be.”

“How many buoys were destroyed in the two systems you’ve examined so far?”

“Just over three billion. Each lost monitor had a small, motile explosive that individually targeted it.”

“Very well. Thank you all for your reports. I’d like to confer with the chief investigators for a few moments, then we’ll resume. Please help yourself to refreshments but don’t go far.”

Emma stood up from her chair and immediately had to steady herself with a hand on the table. She felt dizzy and confused. When she looked up Seeüwit was standing at her side.

“I think perhaps a beverage might help,” ze said. “May I get you a fruit juice?”

“Yes, thanks.”

Ze returned a moment later with a mug of orange juice. She took a sip, then another. It was ice cold and pulpy, just the way she liked it. She sank back into her chair. Seeüwit sank to quadruped mode so their faces were nearly level.

“They’re going to indict Earth,” she said. “We’ll be kicked out of Concord, quarantined. They’re going to turn us into Hermits.”

“No, they won’t,” ze said quietly. “The evidence does *not* prove—it doesn’t even *suggest*—that Humans have done this. There’s just one piece of evidence that has an odd correlation.”

“Do you think we did it?”

Ze was silent for a moment. “I know your history, Emma. I can’t honestly say it’s impossible. But no, I don’t believe Humans are responsible.” Ze stared at her silently again. “I’ll tell you what my heart says.”

“You have three hearts.”

“Well, they all say the same thing. Someone has done this *to* you, and they want to make it look like you’re the ones to blame.”

Emma reached out and ze took her hand with zis traveling hand, the one that grew from zis back. Zis thin, strong fingers wrapped around hers. They stayed that way for ten minutes until Feesh 23 returned.

* * *

“Let’s continue,” Feesh 23 called out, and everyone resumed their places at the table. “First, let me answer my opening questions as best as we can.

“One. Was Emma’s suit malfunction intended to kill her? We believe that it was. She showed remarkable presence of mind in ordering her suit to stop thrust within seconds of the malfunction. Throwing the maneuvering pack—with astonishing accuracy, I might add—helped shorten her stay in vacuum. And she survived the loss of oxygen only by intentionally lowering her metabolic rate through a technique called *meditation*,” ze used the Napiian word, “which none of us knew Humans could do. I don’t believe that anyone could have foreseen this combination of actions, which clearly saved her life.

“Two. Was the bomb on the inertia exchanger intended to kill *Violet*? We believe it was not. Had Emma died, we would have conducted the same search, and the chance of not finding the device in time was essentially zero.

“Three. What does it mean that only *most* of the buoys in each of three systems were destroyed? This is clearly tied to the bomb on *Violet*, both by the technology used and the fact that the job was not finished. We believe that this was intentional, which the Captain will discuss momentarily.

“Four. Who did this? That is still an open question. And finally, just to quell the speculations that we know are floating around: there’s no evidence whatsoever that the Weed infestation we just trimmed back could have been caused by the same people; it was completely natural. Captain.”

The Pilot leaned back but did not lower zis head. The Captain rose from his perch.

“Thank you, Feesh 23, chief investigators, and everyone else who worked so hard on this task. You know we are not finished yet; we still have one more system to investigate and repopulate with buoys, and there are still unanswered questions. But some preliminary conclusions are possible.”

He ruffled his head feathers and then smoothed them with one hand. Emma’s circlet advised her that this was equivalent to straightening his shoulders.

“It’s clear that the bait email and fabricator sabotage were specifically designed to kill Emma Fuji, the only Human aboard this ship or any Enforcer ship, without directly implicating the perpetrators. There are tentative signs of AI involvement in both acts, so when we finish replenishing the monitor buoys we will visit the Light Tribe.”

There was another soft flutter of integuments and voices. Emma had never heard of a ship visiting the AIs before.

“The bombs on the inertia exchanger and the buoys were of identical manufacture. Although there are some similarities to Human style, it’s our consensus that that similarity is not strong enough to implicate Humans. We think it’s likely that the only purpose in destroying the buoys is to strengthen the correlation with the bomb—we were meant to find some of those devices and draw the wrong conclusion. It’s disturbing that we cannot identify the source of the materials or of their construction. It is possible that a Hermit tribe may have been responsible, and so we will be searching for candidate Tribes to question.

“Another disturbing fact is that the attack on Emma was launched when *Periwinkle* and *Violet* were docked. This is another indicator that Humans may have been responsible, but it’s just as likely that the culprit chose that time specifically to place the blame on Humans.”

He repeated the head-feather ruffling.

“Feesh 23 will immediately begin an analysis of all the acts of sabotage in order to identify possible suspects—who had access both to *Violet* and also visited the decimated systems? Finally, we issue a formal warning to all Concord ships—Captain’s eyes only—to search their own fabricator systems and engineering spaces to determine if they were tampered with as ours were. Meeting adjourned. End recording.”

Interview #22 with Human Emma Fuji

17 February 520 AC (2633 AD)

7/5/307,597,923/128

S: Would you consider Humans to be warlike?

E: Oh my, another one of those embarrassing topics. Well, we’ve had enough wars, that’s certain. Much of our earliest literature deals with war, or people escaping from war, or how to wage war. I think it’s been a facet of every pre-Contact culture.

S: An important facet?

E: That depends on the culture, doesn’t it? There have been very peaceful cultures and very warlike ones. Some peaceful cultures became very good at war when attacked, or when provoked by demagogues. And some warrior cultures pacified themselves when they realized that it wasn’t actually a successful strategy—usually after losing a war, but still, it’s better than never learning.

S: Where do you think the tendency to war comes from?

E: I think it was present in our ancestral species. Until just before before Contact, there were still several species closely related to Humans living in Africa. One of them, chimpanzees, shared over 95% of our DNA; they were very close cousins. All the other great apes are extinct now, of course, but you’ve been helping us plan how to bring them back. *[Long pause.]* Where was I going with this? Oh. There were well-documented cases in which chimpanzees planned and carried out raids against neighboring troops. Other close relatives never did this, but the prevailing opinion was that war was something we got from our predecessors.

S: I suppose evolution made it impossible to lose once you had it.

E: The peaceful cultures I mentioned only survived in isolation. When there was interaction between cultures, it seems that war inevitably arose sooner or later.

S: Did some cultures glorify war?

E: Ah. Well... yes. Some did. Lots of people in history have come up with the nutty idea that war makes you stronger; hones you. I suppose a lot of people thought that right up to the moment they died. You have to wonder, in that last moment, did they think, “This is for the greater good,” or “I’m being weeded out because I’m not strong enough, and that’s fine.” I don’t think so. I think it’s more likely that they thought, “Oh, waste me! This was supposed to happen to the other guy, not *me!*”

S: But you said “*some* did” glorify war. Some didn’t?

- E: There is clear documentation that we were taming ourselves. The number of wars, and the percentage of the population who died in violence, had been going down for over a thousand years, despite some blips in the twentieth century... ah, the period from about two hundred to one hundred years before Contact. That trend got upended in the Waste, of course, when ninety percent of the Human race died in a few decades. *[Long pause.]* Oh. Anyway. I think most cultures, and the vast majority of individuals, felt that war was an evil thing, and they strove to prevent it. But it only takes one to pick a fight, and your principles can't survive someone shooting you in the head.
- S: Unless you're a Pilot. Or a Thweett.
- E: Ha! Yes, it isn't a very good design, is it, to put your goodies out where anyone can clobber them?
- S: Like Human male anatomy.
- E: *[Laughs loud and long.]* I think you may have spotted a connection we never thought of.

Prokaryotic

The last sabotaged system they had to replenish with monitor buoys was Prokaryotic: it had microbial life but nothing else. Emma didn't bother researching the locals this time. While the profound differences in chemistry, inheritance, and lifestyle between one world's strain of bacteria and another's was certainly fascinating to someone, somewhere, that person was not her. There were over three billion such planets in the galaxy, and without a really good microscope you couldn't tell the difference between any of them.

With her sabotage research now completed, Emma went back to her normal shipboard life. She went for a long run at dawn, played with Moondog, continued her Concord studies, experimented with a new tagging stroke, and walked the clean, nearly empty streets of deck three. One day she took a transport to the labyrinth from which the bait message had been sent.

It wasn't hard to reach the center of the maze, whose marble walls towered over her, at least seven meters high. She had a good sense of direction, so although there were no visual clues—no visible sun overhead, no compass directions if she had had a compass—she could remember which dead ends she'd already tried. She sat down on a bench at the center of the maze, looking at the Nexus terminal and wondering who wanted her dead, and why. When she decided it was time to go home, she exited the maze without a single wrong turn.

Shortly after leaving the maze, walking back to the transport station, she saw Fichtek coming toward her at a fast trot. The Kchik waved a long, thin arm and stopped beyond arm's reach.

"Greetings, Emma," he said in his own singsong language, and rotated his body at the segmentation point, where it constricted to a wasp waist thinner than her arm. This was a Kchik bow; she did the Human version.

"Hello, Fichtek," she said. "I haven't seen you recently."

"Yes, one's superiors have been keeping one very busy. One believes we haven't met since the day of your horrible experience outside."

"You're right."

"Have you fully recovered from the trauma?"

"Oh, of course, thanks for asking. Humans are pretty resilient."

"One sees that." He did in fact rotate his dinosaur-like head to look at her with one pair of eyes, and then the other pair on the other side of his head. "In fact, one sees that you are looking as well as ever."

"Thank you. You're looking very strong as well."

"That is because one is always kept running. Farewell." He took off again at the same loping speed.

Emma shook her head. She often had the feeling that she could understand what was going on in Seeüwit's mind (not zis head, which was strictly for sensory organs), and even the Pilots made sense to her—usually. But the Kchiks were a mystery. Their faces showed no discernible expression, they had no

tsheef or feathers or fur to give away their feelings, and their posture was indecipherable unless they performed ritualistic movements. Their language always followed the same rising and falling inflection no matter what they were saying. One would tell you his eggs had been eaten by a crocodile in the same tone of voice he'd use to inform you that he'd been made king of the planet.

She continued on toward home, looking forward to playing fetch with Moondog before it got too dark. She was expecting a twitch from Nicolás tomorrow, and the thought made her feel strangely warm—and nervous at the same time.

Resilient

7 April 521 AC (2634 AD)
7/5/307,597,925/138

Silence of the damned

A whole day had gone by and Nicolás had not twitched her. Nothing from Central Dispatch. *Periwinkle* had never missed a scheduled translation by more than a few hours before.

She found herself reading the same screen on the Pip-vesh home planet ecology for the fourth time, diligently trying to understand Ssattafer's implication that she would not survive in their habitat. She realized she wasn't going to get anything done today and twitched Seeüwit.

"Emma," ze said. "Have you figured it out yet?"

"Seeüwit, have you received any messages from *Periwinkle* since they translated back in?"

There was a pause. "They were expected back thirty-five hours ago. No, I haven't received anything. Ask Nexus and I'll be right there."

"Nexus," Emma said, "check your incoming queues. Has anyone received any messages from *Periwinkle* in the last day?"

"No messages," it said. "This usually means they're still in the bubble, but I see they're overdue. Let me check with the Pilots."

While she was waiting Seeüwit came through the door of her office building. "What news?" ze said.

"Nexus is checking with the Pilots."

"Nexus," Seeüwit said, "have we received confirmation of sabotage on any other ship in response to our broadcasts?"

It said, "Of the 813 currently active ships, 672 have responded, all negative. The rest are presumably in the bubble, and none beside *Periwinkle* is overdue."

"It doesn't mean anything," Seeüwit said.

She said, "But they've never been late before."

"Nexus, show us where they were heading."

A map of the galaxy sprang up in the air. A glowing purple sphere showed *Violet's* current position; they were still in the third decimated system, scheduled to leave in a half day or so. It was located in the Sagittarius arm about fifteen degrees counter-clockwise around the galaxy from Earth. A blinking light blue sphere showed where *Periwinkle* had left their rendezvous, in the Perseus arm, winding farther from the core than Sagittarius. Another blue sphere blinked where *Periwinkle* had been expected yesterday, farther out and farther clockwise from *Violet*.

Travel through the bubble was extremely safe, since they always chose low-mass universes. *Periwinkle's* transit points in space-time and their intended speed were all known. Their arrival should have been predictable.

"Response from the Pilots," Nexus said. "No known reason for the delay. They declined to take a guess."

"It still doesn't mean anything," Seeüwit said.

"It means they're late."

Nexus said, "I've notified the Captain and the relevant departments. Wait a moment, please..." It was a long moment. "The Captain has just issued orders to accelerate our work here and prepare for departure in a little over three hours."

"The Captain thinks it means something," Emma said. Seeüwit had no response.

* * *

Concord ships could extract energy from the Fless substrate essentially for free; or at least, with vastly less energy expended than returned. The inertia exchangers that ramped up a ship's velocity during translation were limited by mass, volume, and expended energy—but energy was free. By choosing very small bubbles to translate through they could theoretically travel at effective speeds millions of times lightspeed.

Someone might put these three facts together and conclude, therefore, that ships always traveled at the fastest possible speed, because why not? The reasons why not were subtle and had taken millions of years, and hundreds of lost ships, to pin down.

The inertia exchangers were degraded somewhat during each use; the higher the desired speed, the more damage was done. Ordinarily this minor damage was repaired by automatic systems after each transfer, well before the exchangers were needed again, but it did take time, which limited how soon you could transfer again, either in or out.

Also, the equation that integrated mass, volume, velocity, and energy had a tipping point beyond which the degradation involved the entire ship and every one of its molecules. It was difficult to survive having your molecules ripped to their constituent atoms, as many of the lost ships had discovered. This inflection point was a little tricky to calculate, so typically ships stayed well out of the red zone, which meant “reasonable” speeds were around ten percent of lightspeed.

It had been discovered empirically (again, by some of the lost ships) that the smaller the universe the less likely that it was empty. Over the course of a billion years, Concord had identified every single bubble universe they could reach—at least, they were pretty sure they had. The sizes varied considerably, but most universes seemed to be populated with roughly the same matter density as ours. There were an awful lot of them, but if you were looking for smaller universes than ours, with low mass, the number dwindled to a few thousand.

Another discovery (more lost ships) was that Concord was not the only civilization using the bubbles. Concord had no idea who these Others were, how many of them there were, or which universe or universes they called home, but they didn't seem to appreciate sharing.

Therefore, in the spirit of its mission of keeping the peace, Concord obligingly stayed away from the universes claimed by these Others, which left it with perhaps a hundred to choose from. The really useful ones were at least ten thousand times smaller than our universe, which gave an effective speed of about a thousand times light, and just a handful of the bubbles accounted for almost all Concord traffic.

Unless you were really in a hurry.

Periwinkle should have taken twelve days to reach its destination. *Violet* had moved pretty far since their rendezvous, but Nexus told Emma when she asked that they expected to reach that system in less than two days.

* * *

Two days was a very long time. Emma turned back to the Pip-vesh problem several times the first day, each time giving up from an inability to concentrate. Seeüwit loitered around her office in case she wanted to talk, but she didn't. She wanted the ship to fly faster.

On the second day she went for a different daybreak run than usual, heading away from the lake, through the forest and out onto the plains to the north. The tall, dry grasses swayed in the breeze, and every so often small, startled antelopes popped up above the stalks like spring-activated toys. She stopped for a drink and a breather at a creek so far away from her cottage that she couldn't even see the forest. She vaguely remembered this spot from a solo hike she'd done once. There was an outcrop of boulders just a kilometer or so farther on. She ran toward it.

When she reached the rock she climbed up the warm, rounded face of the lowest boulder, hopped over a gap to another one that was overshadowed by a really big monster of stone, and had to pull out some old rock-climbing moves to scale that. In a few minutes she was at the highest point of the pile, perhaps twenty meters off the ground. She could just see the very tops of the trees back in the direction of her home.

The Human habitat, version one, was very long in the north-south direction, over fifteen hundred kilometers, but only a little over two hundred kilometers wide. When the new section was done it would be over five times larger, with all of the new area to the east of the current habitat. She was closer to the west edge of the habitat than to the center, but she couldn't see the near edge in any direction; it looked like the prairie ran on forever to the north, east, and west.

In fact, she knew that if she went about five hundred kilometers north she would hit the foothills of a mountain range that got steeper and steeper until it formed an impassible wall: the northern edge of the habitat. Between here and there were many kilometers of well-watered prairie and then another, even larger forest, boreal this time. If she went far enough south she would find a lush, subtropical zone that ended at a small sea, on the other side of which was a desert. And that gradually faded into another forest near the ship's equator and the southern end of the habitat. She hadn't really explored the areas south of her home forest yet; she'd been born on the northern edge of what had been the temperate zone of Earth before the Waste, and she was still most comfortable in that kind of environment.

She asked her circlet how far she'd come: twelve kilometers. That was far enough. She clambered down, found a stream a little ways away for another drink, and headed back home.

* * *

It was late afternoon by Emma's habitat time. She joined Seeüwit in the Pilot's Lounge. Ze looked at her as she came in but didn't do more than ruffle zis tsheef in greeting. She got a sweet fruit-and-nut bar from the fabricator and stood close to the Thweett, chewing but otherwise silent.

The familiar flash came and went. They were not far from a water world, hanging just above the terminator, with many puffy clouds and no visible land in the sunlit half. A golden yellow sun hung off to one side, bright and beautiful.

"Messages?" she silently asked her twitcher.

"Five new messages," it said inside her head. She asked it to flip through them; four were from friends, one from her mother. Nothing from Nicolás. She felt her stomach twist. She had not dared to consciously hope that *Periwinkle* would come out while they were in the bubble; but the hope had been here nevertheless.

She turned to Seeüwit. "Anything?"

"Not so far. Nexus?"

"No messages from *Periwinkle*," it said. "We're starting our scan."

It took less than ten minutes. The Captain twittered behind them at the open entrance to their alcove. Emma turned and, despite the difference in alien body language, knew the truth.

"I'm sorry," the Captain said. He walked out to the viewing edge of the house-sized room where Emma and Seeüwit stood. Unlike Earth birds, Aashaa did not bob their heads when they walked. He lowered his head and put one of his four hands on Emma's arm and another on her shoulder.

"We've found an expanding bubble of plasma," he said, "approximately where we would have expected *Periwinkle* to be. It's clear that their inertia exchanger was sabotaged just as ours was. But they never discovered the bomb."

Interview #25 with Human Emma Fuji

25 March 520 AC (2633 AD)

7/5/307,597,923/0

S: Let's talk about love.

E: Ha! You sound like a song. You know, I was surprised during my studies at university to find that so many Human emotions are, if not universal, very common. Like love.

S: Emotions are an organism's way of representing internally its response to external stimuli. It's highly advantageous for any creature to care whether it lives or dies, or whether its offspring

- survive to maturity, or whether a conspecific is treating it well or badly. Similar situations call forth similar emotions.
- E: But not every Tribe has every emotion, and some don't have them at all as far as anyone can tell.
- S: Yes, but we're here to talk about Humans and their emotions. Specifically, love.
- E: Well, many songs, most stories and plays, and a substantial fraction of all the non-fiction ever written on Earth deal with love. I don't think I can even scratch the surface in a fifteen minute interview.
- S: Give it a try.
- E: Okay. *[Long pause.]* I think the simplest way to explain it is when someone else becomes so important to you that their pain hurts you, their joy uplifts you, their absence causes sorrow and longing. And their death hollows you out.
- S: Do you have experience with the death of a loved one?
- E: My mother's mother died when I was fourteen. It was very hard; she was like a second mother to me. I never knew my other three grandparents, and my parents are still alive. So far that's my only experience with death.
- S: Tell us briefly about the grandmother you lost.
- E: She was larger than life to me. Quite tall, very hale, but her hair was pure white. She used to take me hiking up in the hills. When we got to the stony top I'd be panting and doubled over, and she'd just laugh at me, stand with her face to the wind and her arms thrown back, and howl up at the sky.
- S: Why?
- E: Sheer joy, I think. She loved Caledonia, loved the hills and the rocky soil, loved the firths and bays, loved the miserable weather. She spent her whole life replanting forests that had been cut down six centuries ago to build warships.
- S: You love your parents, too?
- E: Of course. My mother is a hard woman, very serious, a doctor who's spent most of her life trying to deal with the famines and diseases left over from the Waste. But she loved me and she let me know it, in so many ways.
- S: And your father?
- E: He's very quiet, not demonstrative. I think there's a huge cultural gulf there. But I watch the way he looks at my mother and I can see he loves her beyond reason. He gave up his country and people to be with her. They were separated for years when she worked on *Periwinkle*, but I don't think his feelings diminished one bit. Sometimes I catch him looking at me in almost the same way; proud, amused, maybe bemused a little too. I love him to pieces. Sometimes we spend a whole day together and never say a word, but the things unsaid are more than enough.
- S: Tell us about Nicolás.
- E: *[Blushes. This is a common Human reaction to certain strong emotions.]* Ah, what do you want to know?
- S: Just tell us about your feelings for him.
- E: *[Seems about to start but doesn't say anything.]*
- S: Okay, let's come back to that. Can you tell us a little about him? Is he from Caledonia too?
- E: No, he's from Argentina. That's a medium-sized state in the southern hemisphere, on the east coast of South America. He's a language expert. I know five languages—
- S: Really? Which ones?
- E: Oh. Napian, of course, that's the most common language used on Earth, which Concord helped us develop. English, which is the most recent language spoken in Caledonia before Contact. Spanish; English and Spanish are the precursors of Napian. Mandarin, which more people used to speak than any other language. And Japanese, which is the ancestral language of my father's homeland.

S: Sorry to interrupt.

E: That's okay. Ah, Nicolás: he speaks twenty languages, and he's studied dozens more. For the last decade or so he's been learning the languages of Concord's Members. I think he's gotten pretty good at speaking Pilot, but a lot of your languages use sounds that Humans can't reproduce. He can understand speech from half a dozen Tribes, though.

S: What is it you like about him?

E: [*Blushes again.*] He's... very soft-spoken, very gentle. Kind. Scary smart. Funny in a slightly obnoxious way.

S: Obnoxiously funny?

E: He likes to joke about my height.

S: Your height?

E: I'm just about average height for a Human woman—my mother's tall but my father is quite short—and most people think I'm too thin. Nicolás is just under average height for a man, so he likes it that I'm several centimeters shorter than he is. I gather he's dated a lot of tall women.

S: Why would he do that if he prefers women shorter than he is?

E: You'll have to ask him. Anyway, he likes to joke that I'm the perfect height, which is a little irritating because he knows that I wish I were taller.

S: I don't understand your Tribe's obsession with always wanting to be something you're not. This is something that the children of most Tribes grapple with and conquer before adulthood.

E: Yeah, well you've said yourself that we're still children.

S: Hmm. Back to Nicolás. You met on *Periwinkle*?

E: Yes, he introduced himself at my arrival party—they're always throwing parties on that ship, any occasion will do—and something just clicked. I don't think it was two weeks before we were together.

S: And you love him.

E: [*Long pause, but significantly—no blushing.*] Yes, I do. But like my parents when Mother was on *Periwinkle*, we're separated for now.

S: You said absence causes sorrow and longing. Is that how you feel?

E: Oh yes. Very much yes.

Gathering the light of death

The division of responsibility between Captain and Pilot of a Concord ship was a bit fuzzy. Captains set overall policy and had operational command, but no one went anywhere without the Pilot's approval—after seven billion years, Pilots were still the only Tribe that understood how to reliably translate ships between bubble universes—and no Captain would even remotely consider a major action without consulting the Pilots first.

The Pilots surely had a species name, like Thweetts, Aashaas, and Humans; but she had never heard or read it. Young or old, active duty or retired, and whether they had ever actually taken a ship through into another universe or not, everyone just called them Pilots. Including themselves. They were the oldest Tribe in Concord, co-founders of the union, one of only three Tribes at Level Eleven, and they were not to be trifled with.

So moments after discovering the expanding bubble of gas that had recently been the one and only Human spaceship, *Periwinkle Monitor*, the Captain spoke briefly with the Pilots that were present in the command center, and then gave orders to perform a Light Retreat.

While Nexus, the Pilots, and the other command crew prepared a flight plan, the Captain took a few minutes to give Emma the bad news: 33,974 of the best people that Earth had to offer, plus almost as many Pilots, several thousand Thweetts, and a handful of Aashaas had been vaporized.

He told Emma and Seeüwit what they were planning to do and suggested that they stay where they were to witness it. Then he hurried back to his command post.

After the first few sentences, Emma lost the thread of what he was saying. She didn't bother to ask for clarification, before or after he left. She just sank down into a chair and wept.

She had spent a year on that ship, her mother seven. Her friends, colleagues, acquaintances, rivals—and one lover, almost her fiancé—were dead. Scientists, cultural liaisons, technicians, support staff, command trainees, artists and musicians, wives and husbands, children. And now Humans were once again a Tribe with no spaceship; the only Members with no spaceship, and who knew if they would ever get another.

“Commencing Light Retreat,” Nexus said. “First translation.”

The giant screen flashed and suddenly they were looking at a star field. A yellow sun was just possible to pick out from the background stars, but then a set of blue crosshairs started blinking around it, and the display zoomed in while the crosshairs continued to blink. The star grew larger until they could discern a disk. Suddenly a bright point blossomed right next to the star, searing blue-white, and faded slowly. Emma stared at the rapidly diminishing glow: that was all that was left of her lover, her friends, and perhaps her Tribe's hopes for the future.

“Time stamp obtained, sub-second accuracy,” Nexus said. “Second translation.”

The screen flashed again, and again the crosshairs picked out the star. The actinic glow appeared again.

“Millisecond accuracy,” Nexus said. “Third translation.”

Red flash, blinking cursor, blue flash.

“Microsecond accuracy. Commencing full retreat.”

This time there was almost no delay between the red-to-white flash of translation and the blue flash of the explosion. Then the red-white flash came again, the blue, the red-white, the blue, speeding up until the screen was a blur of light, which suddenly stopped and left a black, inactive display.

“What the *waste* is going on?” Emma screamed.

Seeüwit put two arms around her. She fought back and then slumped against zim, crying again. The Thweett sang to her in zis native birdsong trills and clicks, something that sounded like a lullaby but which she didn't recognize. After a few minutes she felt herself starting to relax.

“I'm okay,” she said, “really,” and ze let her go.

Ze looked at her with one eye, then did something she had never seen zim do before: rotated zis hexagonal head and looked at her with a different eye.

“Please tell me what that was.”

“Still is: it will be going on for several hours, but the translation rate has increased to the point that there's nothing to see but a white screen.”

She sniffed and wiped her face with her sleeve. Seeüwit went to the bar and got her a towel, which she used on her face and then threw onto the floor. She collapsed into a chair and Seeüwit squatted down so they were face to face.

“The Captain and Pilots want every scrap of information they can get on what happened to *Periwinkle*. But the explosion happened...” Ze hesitated, apparently talking to Nexus through zis twitcher bracelet. “Just over a day ago. We can't go back in time, but we can travel out from the explosion and catch the light wave as it passes us. Right now we're spiraling out from the *Periwinkle*'s translation point, translating ourselves out and around that point twenty times a minute to watch the explosion over and over. It's called a Light Retreat: just outpacing the wave front so you can see it thousands of times from all different angles.”

“So they're watching Nicolás die again and again.”

“It's too fast for any of us to comprehend. No person is watching it now. Nexus and the other sensor systems are gathering enormous amounts of data, which they will eventually collate into a comprehensive description of the explosion at every level from Fless fields to molecular...” Ze stopped and Emma knew why. Molecular disintegration, ze was about to say. Vaporization. Death.

“How long will they keep this up?”

“Since we’re not exchanging much inertia, just drifting around the star, the engine degradation is minor. So we’ll probably keep going for five or six hours. When it gets close to the red line we’ll have to stop to allow the ship to repair itself. You should go home and get some sleep.”

She laughed bitterly.

Ze said, “Do you want me to come with you?”

“No. Thank you.” She stood up, wobbled slightly, and got her balance. “Ah, sorry about...”

“Don’t concern yourself. I understand. Many of us lost friends and colleagues too.” She had momentarily forgotten that Seeüwit had once been posted to *Periwinkle*. Ze must have known most of the Thweetts that died, and a lot of the Humans too. “Go home and get some rest.”

“Is this the end for us?” she said.

“Don’t be ridiculous. It’s a tragedy and an outage, but it’s not your fault. We will find out who’s responsible. Humans are still Members of Concord, and Concord will not reject you.”

* * *

She couldn’t possibly sleep. It was twilight in her habitat, so she took Moondog outside and threw the rubber ball for her until it got dark. She had to stop every now and then to wipe the tears away so she could see what she was doing.

At dawn she rolled over in bed. Moondog was lying on the dog bed beside Emma’s; the dog raised her eyes to look at Emma without moving her head, then closed her eyes again.

Emma wasn’t sure if she’d slept at all. It didn’t feel like it. She ought to go for a run but she’d been on that long one yesterday and she didn’t think she had the energy to lift her head, let alone go running.

Someone knocked at her front door and Moondog barked twice. Emma’s heart raced. She bounced out of bed, threw on a long T-shirt, and ran to the door.

It was Seeüwit. “May I come in?” ze said.

She stood aside to let zim pass. Moondog was standing in the hall, tail wagging at the sight of her racing buddy.

They went into the kitchen. “Strong coffee, black,” she told the kitchen fabricator. It was ready in just a few seconds. She sat at the little table and wrapped her hands around the mug; now that she had it, she thought that if she drank any she would throw up.

Seeüwit studied her face for several moments. Emma had no inclination to speak yet. So they sat quietly until Emma felt she could handle a sip of coffee. It was good; the nausea had passed.

“Ah,” she said, “did you still know a lot of people on *Periwinkle*?”

“Quite a few. No relatives, but I had a lot of friends there from my years aboard, from all four Tribes.”

She couldn’t think of anything else to say for a moment. Then, “I’m sorry if I was self-centered yesterday. It was the shock.”

“You don’t need to apologize. Many of us lost friends, but it was a Human ship... *the* Human ship, and your Tribe could not spare the people you lost. Any of them.”

After another long pause, ze said, “The Light Retreat is finished. It will take a day or so to analyze the data, and three days to repair the engines. So we’re coasting here until then. The Captain hasn’t announced our next destination, but a lot of people think we’ll be going to the Light Tribe.”

“That will be different.” She might have been excited by this once, but she was finding it hard to care. She took another sip from her mug.

“It’s been a very long time since anyone from Concord has been there. They don’t really welcome visitors.” She didn’t say anything. “The reason for *my* visit is to ask, as a friend, if you would be willing to accept more guests later today.”

“I don’t know if I can handle that.”

“I understand. This is a special case, though. A delegation of Pilots would like to meet you, here, in your habitat. For a discussion. If that’s okay.”

In her sleep-deprived, grieving, muddled state she was having a hard time grasping what ze meant. She replayed the last few sentences over in her head.

“The Pilots want to come here?”

“Not a large party, just a handful. You wouldn’t have to entertain them—no food or whatever. They’d just like to talk to you and they thought it would be best to do it in your own habitat.”

To Emma’s knowledge, no Pilot had ever visited a Human habitat before, either on *Violet* or on *Periwinkle*. It was unprecedented. Of course, so was the loss of *Periwinkle*.

“Well, I’d be honored,” she said. “Scared witless, but sure. Ah... where? Maybe not in the house, it’s rather small.” She thought for a moment. “Maybe the amphitheater?”

“I think that would be perfect,” ze said. “I won’t be here; they’ve made it plain that they want to talk to you alone. When would be convenient for you?”

“Can I have a couple of hours?”

“Of course. I’ll let them know. They’ll send a message when they’re on their way. I’d suggest meeting them at the transport station, just out of courtesy. Oh, and I almost forgot: you should bring Moondog too. Some of them would like to meet her.”

“Really?”

“You know how rare companion animals are. Symbiosis is well-known, though not that common either, but your relationship with your animals is nearly unique.”

“Okay.” Ze showed no signs of rising from zis crouch. “Was there something else?”

“Emma... Please feel free to call me if you need to talk. Or a couple of shoulders to cry on. I have five.”

“Actually, you don’t have *any* shoulders.”

“I was being metaphorical.”

“Okay. If I feel the metaphorical need to cry, I’ll be sure to let you know.”

The Thweett stood up and she followed zim toward the front door.

“Seeüwit.” Ze paused at the doorway. “Thank you. I’ll call you after the Pilots leave.”

Ze touched her arm and walked toward the transport. She closed the door behind zim.

Just asking

The call announcing their imminent arrival came from her acquaintance Kee 9; ze said the transport would be there in thirteen minutes. She was standing among the rocks in front of the door when it opened exactly thirteen minutes after the call had come in. Leave it to Pilots to understand the ship better than anyone; Emma had never been able to guess within five minutes when she would get anywhere.

Six Pilots scurried out on their thin crab legs. She thought again how much they looked like Galapagos tortoises, with their domed shells and the shapes of their heads—but it was just a passing resemblance. Each end of the elongated shell sported its own head with one mouth and two eyes and antennae, and two long, fractally-bifurcated arms. Instead of a tortoise’s squat, pushing legs, the Pilots had eight thin, multiply-jointed, sharp-tipped limbs that could propel them at an astonishing speed when they were in a hurry.

But the most immediately apparent difference was that their shells were not simply composed of scute plates. Anywhere from two to ten of the plates sported fantastically twisted horns. Some doubled back on themselves, some were branched, some curled into helices. The number and form of the horns varied wildly from one individual to another. These could double the height of the Pilots from about a meter tall at the top of the scutes, to over two.

Kee 9 had two impressive horns that curled forward from one end of zis body, looking exactly like oversized devil’s horns, and three smaller ones on the rest of zis back. She also recognized Feesh 23 and Zeep 4 from the sabotage meeting, the former by the interlocked branches of two horns that grew from

just behind each head, and the latter by a stand of straight-up spikes directly in the middle of zis back that looked like giant porcupine quills.

Emma suspected, but could not prove from her reading, that the Pilots controlled the shape of their horns as they grew, as a statement of fashion and individuality.

One of the Pilots was half the size of the rest and only sported two rudimentary horns, and this one continued to scamper around after the others had stopped to face Emma. She had brought Moondog, as requested, and the dog watched the small Pilot with suspicion and fascination. Finally she couldn't stand it anymore; she raised up off her haunches and barked once.

Immediately the small Pilot stopped and faced Moondog. "Good day," it said in a slightly higher-pitched version of the muted thunderous rumbles that Pilots used for speech. Emma's circlet translated this as a young-sounding voice and she realized that the small one must be a child. "My name is Huppeet 72. What Tribe are you from?"

"This is a member of the Human Tribe," Kee 9 said. "But this individual is not a Human. It is the companion animal I told you about." Ze turned back to Emma. "My apologies, Emma. I was hoping that my youngest would behave zimsel. Ze has been pleading with me to bring zim ever since ze heard we were planning to visit you."

"No, please don't apologize. I am honored that you would feel comfortable enough to bring your child." She turned to the youngster. "Huppeet 72, I am pleased to meet you. My name is Emma Grey Fuji."

"Good day, Emma Grey Fuji. Please tell me the name of your anomaly."

She looked at Kee 9. Ze chuffed in a way that her circlet translated as laughter. "Ze means the dog. Ze has been studying the various Tribes, and as you know Humans are the only extant Tribe that keeps pets."

"Her name is Moondog," she told the child.

Ze tilted back to look her up and down. "Thank you. Your clothing is very interesting. Would you mind taking it off?"

Kee 9 hissed at zis child. "Huppeet 72, do you remember the limit I specified?" The child bobbed the antennae on one head. "That limit has been reached. Do you understand?" The antennae dipped again. "My apologies again, Emma. Ze knows what Humans look like under their clothes, but..."

Emma tried to stop laughing. "I understand. It's different in the flesh. Well. Thank you all for the enormous honor of visiting me in my habitat. If you will follow me, I'll take you to an open place where we can relax and talk."

She led them out of the boulder pile that camouflaged the transport station, down the path that led to the north. The trees that lined the path were dropping their leaves in earnest now; some branches were entirely bare, but the oaks were, as usual, hanging on to every leaf as if it were precious. Before they came to the tagging cliffs she turned right onto another path that led deeper into the woods. After just a few moments they came to a clearing.

The land was scooped out here to form a small amphitheater. A half-round stage at the lowest point was backed by ten-meter pine trees like traditional Christmas trees, with branches that swept all the way to the ground. Around the sides the local mix of birch, elm, walnut, oak, and maple trees crowded in close; the path bifurcated to form an aisle on each side of the bowl. Five rows of stone benches curved around the stage.

The theater could have easily held a hundred people, but nowhere near that many had ever visited the habitat at once. When Nicolás and the others from *Periwinkle* had come visiting they had gathered here on the last night for a ceilidh; by the light of dozens of torches they had taken turns reciting poetry, performing scenes from plays, telling humorous stories, and playing music. Emma's throat tightened at the memory; every one of those joyous, boisterous people was now dead.

"Very impressive," one of the Pilots murmured.

"This is where you held your ceilidh! When Nicolás sang in our language."

“Quite acceptable.”

“Surprisingly appropriate.”

Emma said, “Please sit down here in the bottom row.”

“Emma,” Kee 9 said, “this is very similar to assembly areas that we frequently employ, except that we prefer individual sitting rocks instead of benches. But very nice.”

“I’m glad you find it comfortable.”

The Pilots spread out on the lowest bench, except for the child, who Kee 9 pointed to the end of the second row, where ze sat without making a sound. Evidently zis parent’s warning had sunk in, in a way that was hard to imagine in a Human child. Emma sat on the edge of the low stage facing them, and Moondog lay down beside her, with her muzzle on her paws, keeping her eyes on the young Pilot.

No one said anything for a few moments as they looked around at the theater, the trees surrounding it, and the benches they were sitting on. Emma suddenly had to stifle a nervous laugh; the Pilots looked like a bizarre genetic experiment that had crossed tortoise, porcupine, and red deer and produced friendly, curious monsters.

“These are very impressive vegetations,” Feesh 23 said. “We do not have such tall growths in our habitats.”

Emma recalled that no one knew where the Pilots’ home world was—or had been; their Tribe was so old that many doubted that it still existed. Since their vision was nearly the same as Humans’, they had likely evolved under a yellow star, which by now was probably a red giant that had consumed their planet as it expanded. Or perhaps it had gone past that stage and was now a white dwarf. Unless the other rumors were true, and the Pilots had moved their planet when their sun grew old.

“Beautiful,” one of the Pilots she didn’t know said. Ze turned zis attention from the trees and looked at Emma. “Please allow me to introduce myself, since we have never met. I am Yeep 2.”

“Very nice to meet you,” she said.

“And I am Pree 7,” the last stranger said.

“It’s good to meet you, too. And nice to see you again, Zeep 4 and Feesh 23.”

All the Pilots ducked down briefly in what she interpreted as a bow, and she reciprocated.

“We have come,” Feesh 23 said, “to commiserate with you on the loss of your conspecifics.”

“I am very, very sorry for your grief as well.” There had been almost as many Pilots as Humans on *Periwinkle*. “I feel it even more because I know how long-lived your people are. So many lost years among so many is... crushing.”

“Thank you. And we feel your pain especially because *Periwinkle* was the only Human ship. To be given such a blow at such an early stage of your Membership is unheard-of, and quite grievous for all of us.”

She bowed again. No one said anything else for several moments.

“Amidst all this pain,” Feesh 23 said at last, “all thinking beings would want to know how this terrible thing came to occur. You are aware, of course, that the results of the Light Retreat will be available soon, but this can only tell us *how*. And I know, since you were at the recent meeting, that you—like the rest of us—probably believe it was an explosive similar to the one that was planted on *Violet*.”

“Yes, I do believe that.”

“No one ever seriously believed you had anything to do with this, Emma.” *Uh oh*, she thought. “And the results of the meeting confirmed that. No one on this ship doubts you now, either. But there is something... something distressing that we feel we need to ask you.”

“My dear friends,” she started, then had to gather her courage and take a deep breath. “I will answer anything you ask of me, no matter how much it may hurt. I would do anything at all, even give my life, to find the murderers who committed this despicable action and bring them to justice.”

All the Pilots bobbed in place, even, she noticed, the child Huppeet 72.

“Thank you. I believe you would. Then this is our question, and we must apologize beforehand, but it is a question that must be asked.” Ze paused until she nodded. “Do you think it is possible that Humans destroyed the *Periwinkle Monitor*?”

Emma gasped, but she wasn't completely surprised. It was a reasonable question. But it made her blood run cold to think of the consequences if it were true. The very, very least that would happen would be quarantine. Pilots had memories that spanned eons, and a legendary sense of vengeance. If Humans had intentionally killed thousands of Pilots along with the Humans on *Periwinkle*, no Pilot would ever again agree to pilot a ship for Humans or even transport them on another Tribe's ship. Whether official or not, Humans would become enforced Hermits, locked up in their own solar system with no way out—and knowing, now, what lay outside in the larger galaxy. Before Contact it was easy to imagine that there was no one else out there. But knowing that Concord existed, and that their technology could never be outwitted or equalled, let alone surpassed, would be a death sentence. Humans would never last the average Hermit lifetime of a million years. The wars would convulse and burn until there was nothing left of humanity but a slim file in the Concord archives.

She realized that she needed to respond.

“I know you're familiar with our history,” she said. “There are so many things to be ashamed of in our past; atrocities that stun the imagination. So I can't pretend that we are not capable of such a thing. But nothing like that has happened since Contact—not even a small border war in almost five hundred years. Obviously it's too soon for us to have truly outgrown our childish behavior, but everyone who wants to engage with Concord is motivated by the help you have already given us and the promise of what we can achieve in the future; and those who do not want to engage have no way of affecting events off the Earth. So my answer is that I believe it's possible in an abstract sense, but my brain and my heart are unshakably certain it was not Humans who killed our friends.”

The Pilots had leaned in as she spoke, and they stayed that way without the slightest movement for over a minute after she was done. Then, as if by some silent signal, they all relaxed.

“Thank you for your candor,” Feesh 23 said. “I, for one, feel as you do. We will shelve that horrific idea and follow the facts.” Ze hopped down off the bench and looked up at her. “Would you do us the kindness of showing us more of your delightful habitat now? We have heard from Seeüwit that there is a rather beautiful body of water nearby and also some waterfalls, of which we are very enamored.”

“That would please me very much. If you will all follow me.” She got up and headed up the left-hand aisle. The Pilots followed in single file, with Huppeet 72 and Moondog bringing up the rear. “The water features are past my cottage. If you wouldn't mind, I can stop on the way and get Moondog's favorite toy and show Huppeet 72 a game we play called fetch.”

“Fetch,” Huppeet 72 called out loudly from the back. “Yes, I want to see fetch, please.”

The most remote ceilidh ever

20 March 521 AC (2634 AD)

7/5/307,597,925/117

It was the last evening that *Periwinkle* would be docked with *Violet*, and Emma had prepared something special.

Periwinkle's captain—an Aashaa like almost all Concord ship captains, even though *Periwinkle* was nominally a Human ship—had decreed that a limited number of crew members could come aboard *Violet* each day. They were docked primarily for the purpose of transferring Monitor information, and social gatherings were secondary. It was also made clear by both captains that social exchanges by Humans were primarily for Emma's benefit, since the *Periwinkle* Human crew numbered over thirty thousand and she was alone.

So each Tribe decided for themselves how many would cross over on each of the five days, and who it would be. Emma had no idea how many Aashaas, Pilots, and Thweetts dropped in or swapped ships—

for some did not just visit but traded places—because she was busy every day with Humans. It was exhausting but, after a year without Human contact, also exhilarating.

Emma's wishes were given highest priority. So Nicolás, alone among the visitors, did not go back to *Periwinkle* at the end of the day. And her other closest friends from her year on the other ship—Suyi Li, Mark Whitestone, and Azadeh Tahgavi—were welcome every day. Other than those four, another dozen or so were chosen by lottery for one-day visits, so she never had more than twenty guests in a given day.

She hadn't needed to babysit the others. Some of them wanted to explore the Human habitat, which was almost as big as the one on *Periwinkle*, even though it wasn't finished yet, since the Monitor ship was so much smaller than *Violet*. Others wanted to spend time with the Tribes that didn't have any representatives on *Periwinkle*, the Pip-vesh, Mustjippit, and Uk. So usually she had her four friends and perhaps three others tagging along for day activities.

But not today. Today it had just been the five of them, despite the fact that the last day's lottery had been doubled. They walked up far past the waterfalls for a picnic, spent the afternoon at the tagging wall, and then they helped her prepare the amphitheater for the ceilidh.

She had issued an open invitation to everyone who was coming aboard for this last day to join her for the party. She suggested that they could bring a musical instrument, or prepare a story or some other entertainment to share. They were also warned that the proceedings would be recorded and shown live throughout both *Violet* and *Periwinkle*, so if they were shy of audiences they need not perform.

The fabricators provided a wide variety of food and drink to Emma's specifications, as well as tartan banners to hang from the trees. They also ordered dozens of oil-burning torches, which they planted along the aisles, on both sides of the stage, and across the back of the amphitheater. Emma had told Nexus to make sure the simulated moon was up and full all during the party hours.

Emma asked Nexus to send a carrier to move the baby grand piano from the cottage to the stage. The instrument almost completely filled the small sitting room where it lived, and the machine had to take the legs off to get it out the door. All of them walked alongside the trundling machine, giving unnecessary guidance while they laughed and rejoiced at not having to carry it themselves, which Emma thought to herself would likely have been impossible.

They had just enough time when they finished for a communal shower in the lake. Then they all ordered fresh clothes from the fabricator and wandered out into the pleasantly-cool evening toward the amphitheater.

About ten people were already there when Emma's group arrived, and the noise quickly rose to the point that voices were echoing off the trees. Over the next half hour the rest straggled in: every single Human who'd been aboard that day attended. Emma had invited the other Tribes from *Periwinkle* as well, but the aliens had politely declined as a group, sending a warm message of thanks that explained they would prefer to watch how the Humans interacted when alone.

When everyone had had a chance to fill their glasses and nibble from the dozens of plates of tapas, Emma climbed onto the stage and shook a small silver bell.

"Welcome friends," she said when the noise had abated. "You're about to participate in an ancient Caledonian tradition called a ceilidh—no, I will not spell it, ask your twitcher." She raised her glass at the heckler and went on. "A ceilidh is an interactive party. Everyone is welcome to perform anything they like: poetry, song, story. I once saw a young man do magic tricks at a ceilidh, and he was the most popular act of the evening."

A woman called out, "Hey, can you make *this* guy disappear?" and everyone laughed, even the young man who had his arm around her.

"If you're shy or just don't want to perform, don't feel pressured to do anything except have a good time. If you're not willing to have a good time, the lake is that way. Feel free to jump in."

The crowd laughed again.

“Getting started is always the hard part, so I’ll go first. I’m going to play some traditional Caledonian dance tunes. Please come up to the stage and dance if you like. If you don’t feel like dancing, have another glass of Scotch, and maybe that will change your mind.” More laughter.

Emma went to the piano and without hesitation started in on a vigorous reel. To her delight, over half of the people kicked off their shoes and started dancing. Some of them had more enthusiasm than talent or grace, but that didn’t matter. A few were doing traditional Highland dances, which was startling but intensely gratifying. She played two more dance tunes and then announced that the stage was open.

An officer-in-training, Xiao-shen, who she had known a little during her time on *Periwinkle*, stood at the lip of the stage and told a hilarious story about a Chinese girl who had been stolen from her village by a mischievous dragon. She stopped it from eating her by teaching it dirty poems in Cantonese, one every night, until after three years the dragon declared that it had never had so much fun in its life and deposited her safely back home.

A tall, dark Nigerian woman that Emma had never met sang two haunting songs in her ancestral language of Yoruba. A Russian woman danced a ballet solo while a friend played every instrument of an entire movement of Tchaikovsky on a small synth-clavier. A mathematician that Emma had once studied with on *Periwinkle* told a series of convoluted jokes with multilingual puns that had people gasping for breath and falling onto their butts with laughter.

And near the end of the evening, Nicolás took the stage with his classical guitar and waited for the crowd to quiet down. He sat on a tall stool with one leg up supporting the instrument, playing a haunting, melancholy tune. After several minutes he began to sing.

While traveling through the wasteland
I found a crimson rose.
I had no heart to pick it,
So I left it where it grows.
Now everywhere I wander
I search in vain for blooms.
I cannot find a pathway back
To the land of rose perfume.
No flowers grow, no fragrance wafts
No matter where we are.
The crimson rose still blossoms alone
By the light of lonely stars.

The crowd was silent as the melody continued, and then Nicolás stunned them all by singing the same song in the Pilots’ language. With a low, rumbling voice an octave below his normal speaking tone, he began, “A-rhnm mahnrrha pahntrrm.” Emma gave up trying to follow the original and just listened to the translation from her circlet; his pronunciation was perfect, and as far as she could tell the grammar was spot-on as well.

When he finished, the crowd burst into a screaming ovation stronger than anything they had delivered so far. No one else volunteered to perform after that, and while most people stayed for another hour, the party devolved into small groups talking, drinking, and eating sweets—and a few couples that wandered off into the woods alone.

“Where did you find that song?” Emma asked Nicolás when he came down from the stage.

“I wrote it,” he said. “About a month ago.”

“You know the flower of Caledonia is the thistle, right?”

“I always thought of you more as a rose than a nettle.”

She looked him in the eyes for a long moment. It was an acknowledgment, and a promise that she fulfilled a while later when everyone else had gone back to their ship.

Land of cobalt waters

“The Pilots were very impressed with your honesty,” Seeüwit said. “And with Moondog.”

“Really?”

“Apparently she nearly convinced them she could fly.”

“She doesn’t like waiting for the ball to come back down.”

“No. That last quarter-second can be hell.”

Emma leaned back and put her feet up on the desk. Seeüwit was crouched comfortably in triped mode in his usual corner of her office. Every now and then someone walked past, throwing an oddly-shaped shadow across the window. Frongstay was mostly used by Thweetts, but many Kchiks had offices here too, and it wasn’t unusual to see individuals of any of the other Tribes stroll or skitter by.

“What are you working on now?” Ze said.

“I’m reviewing logs and video from the time *Periwinkle* was docked.”

Ze rose up into biped mode. “Really? Why?”

She hesitated. “I feel like we missed something.”

“You mean, you think we could have prevented it.”

She looked out the window for a while. “Did you watch the ceilidh broadcast?”

“Yes. I think most people did, on both ships.”

“That was just forty Humans, including me, having fun, entertaining each other, and showing off. I worked it out last night. That evening displayed about one ten-thousandth of the talent and potential that died with the ship. I figure that the cumulative remaining life expectancy of the Human crew was around two million years. Maybe a million for the Thweetts, and about six hundred *billion* years for the Pilots. Although I had to take wild guesses for how long you and the Pilots live, because no one will give me a straight answer.”

“This is a little morbid, Emma.”

“No, it’s not. I want to *know* what we lost. And I want to know why.”

Ze studied her for a while before saying, “My family asked me to invite you to visit our habitat tomorrow. Will you come?”

“Tomorrow? When?”

“All day. Anytime in the morning, and stay as long as you feel comfortable.”

She felt like she should think about it, because she was still depressed and didn’t believe she’d be very good company. But she couldn’t possibly turn down an opportunity like this.

“Yes, of course. I’ll come right after breakfast.”

“Bring Moondog. After the Pilots’ glowing praise, she’s a celebrity.”

“Okay, I will. And... thank you.”

“Our pleasure.” Ze walked out into the eternal light of deck three.

Emma continued looking out the window for a while. Then she dropped her feet back to the floor and told Nexus to show her the next video file.

* * *

To make sense of the layout of *Violet’s* decks, Emma thought of each one as a globe, even though they were interconnected in hundreds of places with the other shells above and below. The “northern hemisphere” of deck two contained four habitats and the infrastructure that supported them, plus transport tubes and structural members that were either hidden in the inter-habitat spaces or disguised as mountains. The Human habitat, existing and future, straddled what Emma (knowing she was being as anthropocentric as any of her ancestors) thought of as the prime meridian. The Thweetts were directly to the west, the Kchiks to the east, and the Aashaas were in between them. The habitat directly south—across the equator—was unoccupied and currently uninhabitable. To the west of that were the Mustjippit, to the east the Uk, and in between were the Pip-vesh.

Emma lived alone in a wild space a little bigger than Wales. The Thweetts’ habitat, with a population of around two hundred thousand, was larger than Great Britain had been before the seas rose

in the Waste. Because the two habitats were on the same deck and adjacent, it took her and Moondog only about five minutes in the transport to reach the station Seeüwit had proposed.

She had studied—was constantly studying—the other Members of Concord, their history, biology, culture, and language. At least, she studied whatever was made public by the Tribes. Pilots were coy about their lifespan, place of origin, and the number of planets they occupied; Kchiks would not discuss their sexual practices, although it was known that they had at least two sexes; Pips would not disclose the level of sapience of their vesh symbiotes.

So she knew that Thweetts came from a world circling a K-class red dwarf sun somewhat closer to the Core than Earth, currently on the other side of the galaxy. Their world had orbited the galaxy eleven times since they had joined Concord. She had seen a few images of their planet; the sun was a brilliant orange globe larger than Sol as seen from Earth, and the vegetation was darker than Earth's but otherwise looked similar enough to require a second glance to realize it was alien.

The animals were completely different. Bilateral symmetry had never evolved on their planet; everything was based on six-sided radial symmetry. Thweetts laid hard-shelled eggs in water, and the developing embryos looked just like starfish. Early on the head differentiated from the other arms and the traveling arm migrated from the edge of the body disk to one surface, but their heritage as ocean-living starfish was just as obvious from their ontology as Humans' derivation from fish.

So she had a rough idea what to expect from their habitat: dimmer and redder light, similar but darker vegetation, weird-looking animals.

When the transport door opened she got her first surprise. There were over twenty Thweetts waiting to meet her, in sizes ranging from slightly larger than Seeüwit to smaller than Moondog. Before she could even step out they started up a whistling, clicking chorus that was beautiful and stunningly complex; her circlet didn't try to translate it directly, simply saying that it was a song of joyful greeting.

Three of the small individuals, evidently children, came forward while the rest continued singing, and enticed Moondog out of the transport. The moment she was outside all three young ones ran off at high speed in quadruped mode, and Moondog raced after them.

Emma came out and the doors closed silently behind her. After a moment the singing tapered off, voices dropping out one by one, until there was just a three-part harmony, then two, then a single voice which she recognized as Seeüwit's. Ze stepped forward and ended the song with a high trill.

"Welcome!" ze said in Napien.

She couldn't help herself; she burst out laughing at the contrast between the coarse, guttural Human sound and the beauty of their native language. Seeüwit ruffled zis tsheef in amusement and the rest of them gathered around her, touching her gently on the arms and shoulders and hair.

"Thank you so much for inviting me," she said. "It's a great pleasure to see you all, and thank you for the beautiful welcome."

The group responded with a brief series of acknowledgments and calls of welcome, and then they parted to show her the second surprise: an open-air bus. She had never thought to ask Nexus to provide her with transportation *within* her habitat, unless you counted the hang-glider she used every few months, jumping from the cliffs past the waterfalls. But with a large population and an even larger habitat, of course they would need a way to get around between the transport stations. There were probably fewer than fifty of those in this habitat, some more than a day's walk from the next.

They invited her to step up into the bus; it was low enough that there were no stairs. They had installed a bucket seat for her near the front, and she plopped down into it. The fabric-covered seat was filled with a foam that slowly conformed to her shape. It was very comfortable; someone had studied Human anatomy closely. Everyone climbed aboard and crouched happily in triped mode. The last one to board told the bus's interface to take them home.

Seeüwit was right beside her. "Home?" she said. "Is this your family?"

"Yes. Plus the... hmm, I think you would say mayor."

She had a sudden thought. "Wait, where's Moondog?"

Seeüwit pointed forward. The three children were waiting just ahead by the side of the road, with Moondog lying splay-legged and panting in the dirt beside them. The bus stopped, the children climbed in, and Moondog followed onto the bus and leaped into Emma's lap.

And the third surprise hit her as they traveled with not a bump or a rattle down the smooth road. Everywhere she would expect to find rocks in her own habitat—eroded rises in grade, hillsides, along a swift-running stream that passed beneath the road—there were rocks here, too. But all the rocks were solid crystals, quartz or possibly diamond, with colors ranging from totally clear through pale yellow and rose, to startling lapis blue and obsidian black.

Evidently the Thweetts preferred order even in the molecular structure of their rocks.

* * *

It took them about twenty minutes to reach Seeüwit's family compound. There were no other Thweetts visible during the ride, just a few flying creatures so high up that Emma could not see what they were, and the occasional rustling in the wild shrubbery that lined the road.

Finally they passed through a very tall, solid hedge of nearly-black shrubs. Emma was startled to see that inside the hedge was something very much like an English park—not a public park, but the manicured grounds surrounding a manor. Immensely tall tree-like plants with trunks ten meters in diameter were spaced well away from each other. In between was a hunter-green ground cover that was nothing like grass but seemed to fulfill the same function. As they proceeded she saw, well away from the drive, something like the sculpted shrubs that had adorned some English parks for centuries, but these seemed to be solid green stuff, not composed of individual leaves and branches.

The drive curved and plunged into a dense copse of more almost-trees. These had shiny silver trunks and leaves that were purplish-black on top and pale, matte silver underneath. There was no undergrowth at all. Within the woods it was almost as dark as a moonless night, though as far as Emma could tell it was mid-morning in the habitat. When they emerged from the trees the light regained the golden late-afternoon quality it had had since she arrived.

Ahead now was a single massive building surrounded by a series of lakes. The structure was like a castle out of Human myth, with tall turrets, sprawling sections that seemed to ramble away from the main house and then suddenly grow several stories taller, balconies everywhere, and towers topped with cupolas. She could see gardens growing atop of some parts of the structure, and pseudo-trees that seemed to have grown into the walls.

The effect was eerie and beautiful, not least because the entire jumbled, complex house seemed to have been constructed of obsidian.

“Is that black diamond?” she asked Seeüwit.

“Yes. It's the same technique being used in the remediation of Earth's atmosphere. It sequesters carbon dioxide, strips away the oxygen, and lays down diamond with whatever impurities are specified to give the desired color.”

“But it would take forever to print a house like this!”

“Not forever. The house was completed many millions of years ago, but I understand it only took nine thousand years to grow it.”

* * *

The bus pulled up in front of a grand, covered ramp leading from the drive to the house. The children left first, running on three or four legs into the house. Emma let go of Moondog and she took off at top speed after the kids.

The adults gestured Emma to precede them, and then followed her up the gentle ramp into the house, which had no door, just an open archway. Seeüwit stepped ahead of her and led the way down a black-diamond hallway, arched to a point at the top, lit brightly with what looked like solid gold lamps that shone a light quite a bit whiter than the outdoor illumination. The hallway seemed to go on forever, but they turned off after a minute or so to the right, and Emma had to stifle a laugh.

It was a drawing room. The English term derived from ‘withdrawing,’ meaning a room to retire to after a meal or function—a sitting room. The floor was strewn with cushions in sizes ranging from roughly the size of her head to bigger than her entire body. The light here was softer, more golden. The black walls were adorned with what she had to assume was art, but to her eyes they looked more like shallow cages filled with jumbled dried seaweed.

“Please sit wherever you like,” one of the Thweetts said. Emma chose a medium-sized cushion to sit on and pulled another, larger one behind her back for support. The cushions were covered in something soft; not leather, but it didn’t feel quite like a fabric either.

As her hosts distributed themselves in a circle, Emma realized that she recognized two of them. One had a vermilion lightning bolt in the tsheef running down one side, the other had blue streaks chasing each other around its neck.

“I know you from *Periwinkle*,” she said. “Hooshen, right? And you also, ah... Tettinit.”

The two ruffled their tsheef in the pattern of happy acknowledgement. “We are pleased to see you again, Emma Fuji,” Hooshen said in Napian.

“I’m sorry about your friends on *Periwinkle*,” she said.

“Not as sorry as we are about yours,” Tettinit said. “As terrible as it was, our loss was a tiny fraction of what your Tribe has sacrificed.”

Emma bowed from the waist. She realized as she straightened up that she had never seen Thweetts sit before, only squat. They lowered themselves onto cushions in triped mode, which meant that the traveling arm and what she thought of as their true legs were on the floor, so they were essentially lying on their backs with their mouths, hidden in the tsheef of their bellies, facing up. Their necks were long and flexible, and their heads had three each of two kinds of face, so they could see, hear, and speak as easily in this posture as any other. It looked comfortable.

“Emma,” Seeüwit said, “allow me to introduce you to the administrator of our habitat on *Violet Enforcer*, Jaüket.”

“I’m very happy to meet you, Emma,” ze said in zis own language. “Our introduction has been long-delayed. I don’t leave the habitat very often.”

“Jaüket likes to pretend that ze is overworked,” Seeüwit said.

“*Pretending* to be overworked,” Jaüket said, “is the best way to *prevent* being overworked.”

Tsheef ruffled all around the room, but Emma had the feeling this was an old joke.

“This is an enormous house,” Emma said. “And very striking. It’s interesting that some aspects remind me of English manors.”

“Really?” Jaüket said. “Which aspects?”

“The drive up to the house. This room. And I’d have thought the lights in the corridor were too bright for you.”

“We evolved around a K-class star,” Seeüwit said, “but we have been travelers in Concord for far longer than we lived alone on that world. We’re capable of finding comfort in many environments, and we prefer not to trip while going down the hall.”

This brought a ruffling of tsheef that Emma thought was real amusement.

“So how many people live in this house?”

“This is the entire clan,” Seeüwit said.

Emma opened her mouth and closed it again. She could not think of a polite way to ask what she’d been about to. Only two dozen of them? Had there been some calamity?

“Allow me to explain,” Tettinit interjected. “Most clans on *Violet* have been here since the ship was built about one and a half billion years ago. There are around two hundred clans here, averaging about a thousand people each. This house was grown for a clan of that size, but until we moved here from *Periwinkle* it was vacant; the original occupants moved to a new Enforcer ship long, long ago. There were seven empty estates, and we chose this one—mostly, I think, because of the unusual building materials.”

The others murmured and ruffled assent.

“You all moved here from *Periwinkle*?” Emma said.

“Yes.”

She realized something that had been nagging at her for a while. “When I did.”

“Yes.”

“*Because* I did.”

“Yes.”

She thought for a moment. “Because Seeüwit volunteered to be my mentor.”

“Yes.”

“But I didn’t even know Seeüwit on *Periwinkle*.”

“But I knew you,” Seeüwit said. “I thought it best to watch you remotely while we decided whether to offer you the position here. To keep, I believe you say, a clear eye and a clear head.”

“You were watching me the entire time?”

Seeüwit ruffled in amusement. “We did not intrude on your privacy, if that’s what you’re worried about. You told me that you are not bashful.”

“How long? I mean, how long were you observing me with the idea of offering me this job?”

“Why, from your first day on *Periwinkle*, of course. That’s why you were offered that berth to begin with.”

“You must have really liked my mother.”

“We loved your mother,” Tettinit said. Hooshen, Seeüwit, and several others ruffled in assent.

They were all silent for a moment.

“Our clan was kept small intentionally,” Seeüwit said, “by attrition over the last few thousand years—so we could relocate easily if need be. But we will not move again in this era, so now we are free to grow again, as you have seen.”

Which reminded Emma that she hadn’t seen the children or her dog for a while. “But why did you think you would need to relocate?”

“New Members need mentors,” Seeüwit said.

“Wait a minute! Contact was just over five centuries ago, but you’ve been planning to be our mentors for millenniums?”

“Since ancient Greece.”

“You’ve been watching us that long?” They all ruffled and whistled loudly in laughter. Emma felt sheepish. “Sorry, I was just startled. I almost forgot.”

Monitor buoys and ships watched every star and planet in the galaxy—every stellar nursery, the ten or so new stars that formed each year, every asteroid large enough to be round, every lonely system that wandered in from the cold abyss between galaxies. Concord watched life appear, and wink out or stagnate or grow more complex. They watched intelligence flourish and fall and sometimes step outside its nursery door. They had seen Earth’s trilobites and dinosaurs appear and prosper for a hundred million years, and then sink back to nothing. They had watched Humans evolve from shrews to tool users to lords of the planet—not masters, not even caretakers. Abusers.

“We almost wasted ourselves. You must have been disappointed.”

“I’ve told you before,” Seeüwit said. “Some children need a helping hand.”

As if that were a cue, the three children and Moondog exploded into the room. Moondog launched herself into Emma’s lap and curled up with her head on Emma’s thigh, panting happily and watching the young Thweetts like a hawk.

“Emma Fuji,” the children sang in unison. “Tell us the story of Moondog!”

So Emma recounted once more the history of Moon terriers, then as much as she could remember of how dogs and Humans came to be partners, and how her mother had given her a year-old puppy to take with her when she went off to be alone with the wonderful people of *Violet Enforcer*. The children listened raptly, only occasionally shouting questions, ruffling their tsheef and whistling now and then,

and flipping back and forth from quadruped to triped mode for no reason she could see—other than rapture.

* * *

They'd built a Human washroom into an unused space down the hall from the drawing room, just for this occasion. It was ridiculously oversized, but there was no reason for them not to use the whole room. After she'd used it, half of her hosts excused themselves, taking the children with them, and the other half led her through a maze of corridors—each one giving the illusion of being infinitely long—to a lift. There were no doors; they just stepped into a small open room and it began rising. Moondog huddled up close, leaning against her leg.

Although she didn't experience the gut-sinking feeling that she always had with fast Earth lifts, she could tell by the walls racing by that they were rising rapidly. In a moment they exited onto the roof of the house. Or—as she realized almost immediately—*one* of the roofs. The top of the building was just as complex and baroque as the façade. There were spires and towers rising above the level where they now stood, and she could see the tips of others just barely clearing the parapets here. The group walked to the edge and Seeüwit invited her to look down.

Moondog followed them out, sniffed around for a moment, and then lay down against a solid wall with her head on her paws. Emma could tell by the twitching of the fur over her eyes that she was watching everything, but didn't seem interested in going anywhere near the edge.

The series of lakes she had seen when they arrived was now revealed to be a chain of lakes, from several meters across to a hundred times that, connected by streams and shallow waterfalls. The water in the lakes was a surprising cobalt blue, even in the smallest of them.

“Why is the water that color?”

“Because it's almost four kilometers deep,” Seeüwit said. Several of the others had a brief twittering conversation in their own language, which Emma's circlet reported to be nearly untranslatable, a series of code words perhaps. Seeüwit joined in and apparently ended it. “These are our birthing waters,” ze said. “The others are... embarrassed to discuss this, but every estate has them. We lay our eggs in the water and they sink to the bottom until the young hatch.”

“It's beautiful. So when the eggs hatch, the babies are climbing toward the light?”

“Just so. I've always thought that was a wonderful metaphor as well as being the literal truth. And a goal to guide the rest of one's life by.”

Emma looked out, away from the grounds of the estate. Thick vegetation covered the land except for a few places where crystal outcroppings stood tall enough to show. Far off in the distance she could just see the tip of a single tower that must have been another estate. She followed the parapet around a curve so she could see what the nearby turrets were hiding.

The shock made her stumble. The trees and the house had blocked this from her view on their approach. Now she could see unobstructed to the—she checked with her circlet—north. It was a mountain, but not like any mountain she had ever seen before. Taller than anything on Earth, much taller than Everest, whose summit wasn't even nine kilometers above sea level. The bare peak of this mountain must have nearly touched the habitat ceiling, over thirty kilometers above the ground. Half of its height rose up above the part of the atmosphere where clouds could form, so the sides were layered: vegetation on the lower slopes, then a solid snow cover, and finally the naked crystal rising up so high that she had to look almost straight up to see it.

The entire mountain was composed of diamond.

“Don't hyperventilate,” Seeüwit said. “It's a trick.”

She looked down at zim. “What?”

“It's not as big as it seems. It's true that the summit nearly reaches the next shell, but the breadth of the slope is a trick of perspective. And it's mostly hollow, just a very tough scaffold with several meters of diamond sheathing over it. Enough to support the trees and the snow and its own weight.”

“You really know how to suck the poetry out of a view.”

Ze fluttered in amusement. “I think it’s impressive and beautiful. But not worthy of poetry.”
“Not all of us agree,” Tettinit said. “Seeüwit is perhaps a bit more jaded than some of us.”
“This had to be another reason you chose this place.”

Ze ruffled in agreement.

“Just to prove I’m not too jaded,” Seeüwit said, “let’s go on a picnic.”

* * *

“Do you go on many picnics?” Emma asked when they were settled. They had walked from the house to one of the giant trees, about a kilometer away, whose lowest limbs were at least ten meters off the ground. The eight Thweetts accompanying her carried bundles which turned out to be a large, soft fibrous blanket, pillows like the ones in the drawing room, and food hampers that looked suspiciously as though they’d been copied from pre-Contact photographs from England.

“This is our first one,” Tettinit said. “Seeüwit thought it would be a good melding of our cultures. We do like to spend time outside, but it never occurred to us to make a special event of something as prosaic as a meal.”

“I think Humans are obsessed with food,” Emma said. “We *often* make a special event of eating. Birthdays, weddings, funerals, anniversaries, even marriage proposals are often associated with feasts or special meals.”

Moondog was sitting right next to Emma but she hadn’t taken her eyes off the baskets. Emma looked down and laughed.

“But our obsession with food is *nothing* compared with *dogs!*” She rolled the dog onto her back and started rubbing her belly. Moondog writhed around happily.

“How are we doing so far?” Seeüwit said.

“Very well. Where’s the lemonade?”

Ze chirped and ruffled in laughter and dug out a sealed pitcher that clearly contained lemonade; there were lemon slices floating in it. Ze poured her a tall glass, and a small one for zimself and some of the others, too.

“You’ve done some research,” she said after her first sip. “This is very good. Just the right balance of tart and sweet.”

“I have beer as well. I understand that is also traditional.”

“Not for me, thanks.”

“This is interesting,” Seeüwit said, holding up zis glass and peering through the translucent liquid.

“I like it,” Hooshen said. It was the first time ze had spoken in a while. “Seeüwit prepared your ‘macaroni and cheese’ for us recently, with substitutions that we could digest. I think it may become a favorite.”

“We call that comfort food,” Emma said. “It makes you feel happy just to eat it.”

“I can’t stand this anymore,” one of the others said; one whose name she didn’t remember. “I have to race this creature. Moondog!” The dog’s head popped up. “Come!” Ze flipped into quadruped mode and flew off faster than Emma had ever seen a Thweett move before. Moondog tore off after zim, barking and nearly tripping on her tongue. Emma realized that her mouth was open.

“Neefaweet is young,” Seeüwit explained. “Not much older than you. Here, tell me what you think of this sandwich.”

All the food turned out to be excellent; they had asked the fabricator to help them select appropriate dishes, and of course it did not know how to make bad food. She was curious to see them eat, but in the end she couldn’t really see much. A Thweett’s mouth was situated roughly where a Human’s navel would be, and ordinarily it was completely concealed by the tsheef that covered their entire bodies. They tore their food into small morsels with their hands and popped it into their mouths, opening and closing them so quickly that she was never really sure she had actually seen the orifice.

When Emma was trying to decide whether to have a second brownie, Seeüwit said, “The Light Retreat analysis has been completed.”

She pulled her hand back from the plate of brownies and said flatly, “Really.”

“Unfortunately there was no significant new information. Merely confirmation that the device was very similar to the one we found on *Violet’s* engines. I won’t go into more detail now, but the file is available if you want to review it.”

“I don’t think I will.”

“I didn’t think you would.”

“If it’s any consolation at all,” Tettinit said, “there would have been no pain. The disassembly is so fast—”

Seeüwit held up a hand and ruffled zis tsheef in a pattern Emma had never seen before. She could actually feel the blood draining from her face.

“I’m sorry,” Tettinit said.

“It’s okay,” she said. “I know you’re just trying to be kind. It takes us a while to, to deal with...”

“Let’s change the subject,” Seeüwit said. “We’re leaving this system early tomorrow.”

“Are we still going to see the AIs?”

“Yes. It will take about a month to get there.” Ze hesitated for a moment. “I’ve been thinking about something for a while now and I think it’s time to tell you.”

“Go ahead.”

“I think you should start taking Moondog to work with you.”

“What? Would they let me do that?”

“Yes. I’ve checked with several groups including the Frongstay administrator and the Pilots. And the Captain. They all agree that it would be better for everyone. You will have Moondog’s company during the day, she won’t have to be alone all day, and the interaction between the two of you will be interesting for the rest of us.”

“But she needs...”

“Yes, I understand. If you agree to this, an area behind your office will be walled off and planted with Earth vegetation—grass is it?—for her elimination needs. The rest should be trivial. Your office fabricator can produce her dry food if necessary. Is there anything else?”

“A bed, maybe. Food and water bowls. Easy. Oh, I like this idea! Thank you! It would never have occurred to me to ask.”

“We’ve seen how well she interacts with strangers. And I was hoping it would help you deal with... your loss.”

“Thank you.”

She started reaching for the brownie again, but pulled back when she realized she didn’t really want it.

The others expressed curiosity about how Moondog would deal with the new experiences, and they talked about the dog for a while. Neefaweet and Moondog came back, both panting, while this was still going on, and Moondog’s ears twitched every time one of the Thweetts mentioned her name.

“Who won?” Seeüwit asked Neefaweet when there was a lull.

“It would be disrespectful to our guest to go into details.”

“That’s what I thought.”

“I have a question,” Emma said.

“Please,” several of them said.

“Why are all the rocks here—not to mention your house and that mountain—made of diamond?” No one responded immediately. If she was reading their body language correctly, they all looked sheepish. “I’m sorry, is that an awkward question?”

“Ah,” Tettinit and Seeüwit said at the same time.

“Just tell her,” Neefaweet said. “Who cares?”

“Ah,” Seeüwit said again. “You see, *Violet Enforcer* was constructed almost exactly six times twelve to the eighth Concord years after we became Members.” *About half a billion Earth years*, her circlet

translated. “We knew we would have a major presence on this ship for a very long time, possibly as long as the ship existed. Which as you know has been about a billion and a half Earth years so far...”

Ze stopped. “Yes?” Emma prompted.

Neefaweet ruffled zis tsheef in exasperation. “It was done in commemoration. Of the milestone.”

She looked back and forth between Neefaweet and Seeüwit for a moment before she got it, and then she had to wait for the laughing fit to subside before she could ask.

“Are you telling me that this whole habitat is a diamond anniversary gift to yourselves?”

* * *

Hours later, back at home, she fed Moondog and told her to go to bed. She put on a sweater and walked out to the rocks overlooking the lake.

“Half moon, please,” she said, and the moon rose over the water.

Every time she saw it, she was startled at how good the reproduction was. She knew she was being ridiculous, that it was just a projection, but the quality of the light and the appearance of the disk were so faithful that she could almost believe she was on one of the bens back home looking up at the real thing.

She took a deep breath of the cool autumn air and began to cry. It went on for a while, ebbing and flowing, racking her body with deep sobs and subsiding to snuffles.

When she’d first realized that they were all dead, she had been numb, and then some kind of shock had set in. This was her first real outpouring of grief, and it left her weak, but feeling better than she had in a long time.

She was going to have to write to her mother and try to explain what had happened. But not tonight. Not yet.

* * *

The next morning at breakfast, Nexus informed her that the dog yard behind her office had been finished overnight, complete with a sod lawn for the necessities. So she took Moondog to work with her for the very first time. The dog was ecstatic to be going out, even though Emma had her on a leash, which was very unusual.

When the transport opened on deck three and they headed off down the street, Moondog swept from one side to the other, constantly cutting back and forth, sniffing joyfully. When a Thweett approached, the dog barked happily and the Thweett raised a hand and ruffled its tsheef in greeting. Then a pair of Thweetts walking together stopped to watch them pass by, and Moondog greeted them with the same light yip.

They next met an Aashaa, who called out, “Good morning, Emma and Moondog!” in its own language. But Moondog recognized her name and barked once in response.

In the few minutes that it took to get from the transport to her office, they also came across three Uk lumbering along together (Moondog did not greet them, but hurried her pace, stepping warily as if getting ready to bolt), a gliding boulder of a Mustjippit (Emma had to strain to keep Moondog from running over to investigate zim), two groups of two Pilots each, and a Pip-vesh leaning against a wall pretending not to watch them. Emma was starting to get suspicious. It was unusual to see so many of the Tribes on a single day in Frongstay.

They were almost at her office building when a Kchik came loping by. Moondog shocked her—pulling hard at the leash and barking, not a friendly greeting but a serious, vicious bark that went on until the Kchik was out of sight.

But then they were at the office and Moondog had to explore every bit of the small building, then run twice around the new yard out back and squat to pee. Emma forgot all about it.

Interview #59 with Human Emma Fuji and companion animal Moondog

13 April 521 AC (2634 AD)

7/5/307,597,926/0

Moondog sits quietly on Emma's lap for the duration of this interview, apparently asleep except that her ears prick up every time her name is mentioned.

S: Today was Moondog's first day at work with you. How did it go?

E: You mean except for jumping on Hurrhahurr?

S: I don't think an Earth dog could hurt a Mustjippit any more than you could hurt a star.

E: No, no damage was done, but it was embarrassing.

S: Not to Hurrhahurr. I understand that the hologram has already spread all over the network, and ze is thinking of changing zis name to the equivalent of 'Dog Pedestal.'

E: At least she didn't pee on zim. I do think she thought ze was a rock.

S: A really interesting rock.

E: *[Laughs.]* She wouldn't come down. Especially when Hurrhahurr started singing to her. The vibrations must have felt good, which I suppose is why she fell asleep up there.

S: Okay, but other than leaping onto the oldest Mustjippit on the ship and refusing to come down, how did she do?

E: Very well. She loves her new yard, and she loved all the attention. A lot of people came by to say hello and many of them brought gifts. So she has about twenty new toys here.

S: What's her favorite toy?

E: It's still the solid blue rubber ball. She got two new ones today. You know her yard here is completely walled in, so you can bounce the ball hard enough to ricochet off three walls. I think that's why she's sleeping now; everybody who came had to try it. And maybe I could use a nap, too. *[Pretends to fall asleep.]* Oh, sorry! But the tough chewy toys are also very popular. Every one of them has some tooth marks on it.

S: Did you actually get any work done today?

E: Sure! About five minutes' worth.

S: Did Moondog adapt well to the new environment?

E: Well, this place must smell like me. And you, and you know she loves you, too. So I don't think it was a difficult adjustment. Scent is a dog's primary sense, and they're very adaptable as long as there's something, anything familiar to cling to.

S: From now on she'll be clinging to Mustjippits, I think.

E: I expect to see a line down the block tomorrow morning. Should I sell tickets?

S: You know there's no money here, right?

E: Yes, I did know that. It's an all-inclusive cruise.

S: I think it may be that the Human attachment to dogs is contagious. Moondog is a celebrity. What do you think of the possibility of other Tribes adopting dogs?

E: Humans have made a lot of progress since Contact, but one thing will always be true: there will always be dogs that need a good home.

Determined

13 April 521 AC (2634 AD)
7/5/307,597,926/0

The long road to gaga

A month at *Violet's* top safe speed was a very long time, but they had to travel over twenty thousand light years to reach the Light Tribe's embassy. They were lucky to be that close; the AIs lived in a globular cluster in the galactic halo, but it was currently near its closest approach to the Core in a long, long orbit.

Before they translated, Emma sent her mother the message she had been putting off since her near-fatal excursion. After three drafts she was still not happy with it, but she ran out of time and had to send it unpolished. She was sure Freya would be upset, but there was nothing she could do about that, and it was worse not to tell her and let her remain ignorant than to tell her and let her worry.

During the trip out she finished reviewing all the security video and all the logs from *Periwinkle's* visit. When she was done she had a list of eight crew-members—five Human—who were near the labyrinth when the bait message was sent, or who had unexplained absences that could have been used to sabotage the engines. But she didn't really believe that any of them were responsible; and in any case, all of them were now dead.

In the course of fast-forwarding through all the video she came across snippets of Nicolás working at Nexus terminals, talking with colleagues, walking through Frongstay hand-in-hand with her. She didn't cry, but Moondog looked up at her every time she found one, so she must have made a sound. She had Nexus compile these into one file and stored it. She wondered if she would ever watch it again.

Message from Emma Fuji to Freya Grey

Mother,

I hardly know where to begin explaining what's happened over the last month, or even if I should. So let me begin by saying that I wish you had told me you once worked with Seeüwit, but at the same time I understand why you didn't. I suppose it might have helped to know that practical jokes were once part of your repertoire, but now that I do know it, I find it doesn't really change anything. It does make me feel happy to think of you -- young and pregnant -- getting in one last dig before returning home; but Seeüwit told me about it at a time when I really needed something to distract me. So I will not complain, merely find a way to pay you back in kind when you least expect it.

I don't want to go into too much detail, because I don't want to worry you and because I've been asked -- ordered, almost -- to keep a lid on the teapot. You will get all the particulars someday, I promise.

The ship, and me in particular, were in some danger recently, but the issue has been resolved, no one was hurt, and we're trying to find out who was responsible.

Unfortunately, the same person or group that endangered us also went after *Periwinkle*. I've delayed writing this message until I can think of a gentle way to say this, but I simply can't. *Periwinkle* has been destroyed, and everyone aboard is dead.

The Captain personally gave me permission to tell you this, because of your past service on the ship, with the understanding that you not tell anyone but Father. The event will be made public very soon, after which you are released.

Nicolás was aboard Periwinkle when it was lost. I had seen him shortly before the tragedy, and we had a wonderful five days together. What I'm having the hardest time with is that he sent a message just before they translated telling me he wanted to marry me. It's probably no surprise to you that I would have said yes.

Everything you imagine I am going through is true, but I am bearing up. My friends here have been very supportive. A group of Pilots visited me in my habitat to offer condolences. Seeüwit's family then invited me to a picnic with them in their habitat, if you can believe that. Both of these things are unprecedented, as you know.

The final bit of news is that Moondog has become a celebrity. My latest interview, about her first day at work with me, had the highest network ratings of any interview so far. She was her usual exuberant, canine self -- she jumped up on a Mustjippit's back and wouldn't come down. The holo of that is becoming the most highly-viewed image in the ship's 1.5 billion year history.

I wish I had more of the good news and less of the bad, but that's not the way the world works. Don't worry about me; I am doing as well as possible under the circumstances. I do wish I had your shoulder to cry on, though. Give my love to Father if you can spare any of this that I'm sending your way.

Emma

You've got to be kidding me

When they translated back to their home universe, the view screen in the Pilot's Lounge exploded with light. Emma's knees buckled and she had to hold on to Seeüwit's arm. Ze led her gently to a chair and steadied her as she lowered herself into it; she never took her eyes off the screen.

It wasn't just the overload of illumination. It was brilliant, but the screen's filters made sure the light wasn't blinding. The texture was mind-boggling—the overwhelming proximity of hundreds of thousands of stars packed into a sphere just a few hundred light years in diameter. It was like looking at an enormous dandelion seed head that was composed of piercing points of light.

“It's astonishing,” she whispered.

“Yes,” Seeüwit replied. “Globular clusters are beautiful up close, but dangerous. We had to translate to the periphery so we could switch to a slower bubble. Even a Pilot as experienced as Reevap 2 would not charge full-speed into the center of this cluster.”

“Stars too close?”

“And they move too quickly. You can't trust your maps, and we have no monitors here. We'll take several days to work our way in.”

Emma looked up at zim. This was the first she'd ever heard of the existence of an area of the galaxy that wasn't being constantly monitored by Concord.

“Why are there no monitors?”

“The AIs destroyed all that we sent in. They allow our ships to visit, but they won't allow us to watch them.”

“Why? What are they doing?”

“As far as we can tell, nothing. Nothing at all.”

* * *

In normal globular clusters the heavier objects fell to the center, just as the heaviest metals on Earth had a tendency to sink to its core. Most clusters did not have black holes at their centers, but exotic objects could wind up there. The bulk of these clusters was composed of old, stable stars; all dust, gas, and ephemeral stars had long since been converted to long-lived stars or white dwarfs.

This one had a neutron star at its heart.

Kee 9 joined them in the Pilot's Lounge when they translated back for the last time. Ze climbed up on a rock at the front of their alcove and turned both heads to the view screen.

Emma had trouble understanding what she was seeing. At the center of the screen was a perfectly black, unreflective, spherical object covered with intricate silver scrollwork, like brocade. There was no indication of the scale of the sphere. It took a moment for her to realize that it was surrounded by at least several thousand nearly-identical stars, all glowing dim orange, arranged in a regularly-spaced grid that completely enclosed the central sphere. The background for *those* stars was the brilliant dandelion puffball of light that had shocked her when they first arrived.

“What?” she said in confusion.

Kee 9 turned one head to look at her and rumbled rhythmically in a way that her circlet translated as gentle laughter. “Don't feel bad,” ze said. “Everyone reacts that way the first time they see it.” Ze pointed at the central object. “The neutron star has had all the normal matter scraped off the surface, so what you're *not* seeing—the black surface of the sphere—is pure neutrons, which barely interact with light. The silvery grid is the computing substrate for the AIs. It lies just a few inches above the surface of the neutron star. We don't know what the insulating material is that holds it off the surface.

“The guard stars keep wanderers from drifting into the core. They're arranged to deflect slow-moving stars away. We know the AIs have a mechanism to handle faster-moving objects, but we've never seen it in action.”

“How big is it?”

“The neutron star is about twelve kilometers in diameter—so, less than one percent the size of *Violet*. The guard stars are about the distance from the neutron star that Mars is from your sun. They're spaced out about six million kilometers from each other.”

“How did they do this?”

“The more interesting question is how do they keep it stable. We don't know the answer to either question.”

Emma remembered that the Pilots were reputed to have moved their home world to another star when their original star died. This didn't seem like the time to ask about it. Perhaps moving a star was just like moving a planet, only on a larger scale, but it seemed like a qualitatively harder problem. *Violet* was the size of a small planet, but it was hollow, and here the AIs had carefully arranged tens of thousands of stars to protect their home *and* built a computer on the surface of a neutron star that probably massed twice as much as Earth's sun. Nothing she had studied about Concord prepared her for engineering on this scale.

Seeüwit said, “This arrangement has been in place for over five billion years. Someone must have built it for them, but we don't know who.”

Kee 9 rumbled something and the view on the screen panned out to show a spherical space station orbiting the neutron star. “This is the embassy,” ze said. “Meet us at Shuttle Bay 91 in two hours.”

“What?”

“Well, you're the person most closely affected by the sabotage,” Kee 9 said. “You didn't think we'd leave you out of this conference, did you?”

* * *

The shuttle bay was much larger than it needed to be for the three bus-sized shuttles it held. There was an enormous fabricator outlet on one wall that looked capable of delivering ships twice this size with room to spare. And the bay could probably have held twenty of those.

The shuttles themselves were ovoid, much longer fore-and-aft than side-to-side, made of the same textured, purple aphrosine as the *Violet's* outer hull. Emma wondered why one of these couldn't have come to retrieve her while she was stuck outside, when a hatch opened and she saw why. There was no airlock.

She'd thought she was the first to arrive, for a change, but a Pilot came down the ramp that extruded from the hatch. She didn't know zim, and somehow she got the impression that ze was rather young.

The curling spikes on zis back were smaller than average, and ze moved with a sprightliness even more pronounced than the usual Pilot's crab walk.

"Emma Fuji!" ze rumbled. "I am Teeker 17, your shuttle Pilot."

"Very pleased to meet you," she said, and gave a short bow.

"And I you. I watch all your interviews! I would love to meet your companion Moondog someday."

"I'm sure she would be delighted to meet you, too. Please let me know when it's convenient for you to come by my office in Frongstay."

"Really? Do you mean it? I will do so—thank you."

She bowed again. "I'm not in the wrong place, am I?"

"No, you're just a few minutes early. I just finished the preflight check. The others should be—"

The transport door opened and a small crowd emerged: Seeüwit, the Captain and another Aashaa, and four of the sabotage investigators—two Pilots and two more Thweetts.

"Emma," Seeüwit said, "you beat us here! This is a first. I thought Humans were famous for unpunctuality."

"It's not intentional," she said. "We're just always getting lost."

The Captain laughed with a twitter and one of the Pilots gurgled too. The Captain said, "Have you cleared our approach with the embassy?"

"Yes, Captain," Teeker 17 said. "I informed them that we had eight esteemed visitors seeking audience and one lowly Pilot who would remain on the shuttle."

"Finish growing and stand up straight," Feesh 23 said, "and you will no longer be lowly."

Emma blinked. She hadn't been aware that Pilots had a sense of humor. Or perhaps that was meant literally, and not as a joke. But she saw that Seeüwit's tsheef were ruffling in a suppressed laugh.

She followed the rest onto the shuttle. There were seats of various designs and also open spaces for those who had no need of them. She found a single, high-backed, Human-style chair, very well-padded, and sat down. There were no visible seat belts.

The hatch closed and sealed, becoming invisible; just a smooth wall where it had been. She could see straight through to the Pilot's platform at the front, which was something like a stone mushroom. Teeker 17's legs wrapped under to grab the mushroom cap, anchoring zim.

"Everyone ready?" ze said. There were grumbles and whistles of assent.

The entire top half of the shuttle—which had been an opaque wall of aphrosine—suddenly became transparent. The shuttle lifted smoothly without a shudder or any sense of movement and drifted toward the big airlock, which opened to receive them. It closed behind, and after a brief pause the thicker outer door slid out and up.

The cluster was devastating enough when seen through a view screen. Emma looked all around her and tried to breathe normally. Everywhere she looked she could see stars, solid walls of stars with just hints of gaps between them, the same in every direction, like a blizzard she had driven through once when she was at university. In a moment the station came into view and she focused on that, trying to ignore the oppressive attack of light coming from everywhere at once.

As they got closer it became clear that the station wasn't large, nowhere near the size of *Violet*. In fact it seemed to be only about the size of a large building. It was spherical, shiny and metallic, reflecting the abundance of stars around them, and absolutely featureless.

Teeker 17 murmured something in a deep growl that her circlet didn't bother translating. A dark pinpoint appeared on the near hemisphere and irised open to become a porthole large enough for the shuttle. They headed straight toward it and glided inside. Emma looked behind her and saw the opening close behind them.

They were in a roomy bay whose shape was hard to determine, because it was made of the same shiny stuff as the station's exterior. It was smaller than the one they'd left on *Violet* but more than large enough for the shuttle. They set down on the floor without a bump.

The shuttle door reappeared and opened, and a ramp pushed out and down. Emma was surprised that there had been no hesitation in opening the hatch, and no hiss of equalizing pressure. The Concord people must trust their hosts to provide an adequate environment; or perhaps the door wouldn't have opened if that had not been present.

Once again she followed the others. Teeker 17 wagged the antennae on one head at her when she walked by, but ze didn't say anything.

It was Zeep 4 who led them across the bay to an unmarked spot on the wall, exactly like every other spot on the wall. It irised open and they walked into a large, empty room. This one was not silvery and reflecting; the walls, ceiling, and floor were a creamy white. There were no sharp corners, every join between surfaces was curved. The floor gave slightly as she walked on it, like a thin sheet of rubber over steel.

The opening irised closed behind them. They spread out a little and stood, waiting. After a moment a much larger doorway in the far wall began to open. When it was as tall as it could get, a monster straight out of nightmares surged through it and charged toward them. Emma shrieked.

“Stop!” the Captain commanded in his most authoritative whistle. The hideous thing immediately halted and stood still.

It was almost too tall to stand in the room, which was over four meters high. Its body was composed of black, shiny, overlapping plates with spines and barbs all over them. Four lobster-claw arms with wicked steely blades at their tips hung from each side of its body. The legs were thick and barbed, with three killing claws on each foot. She couldn't tell how many feet there were; a lot. The head was bulbous and ugly, with a mouth large enough to swallow her whole, lined with thousands of sharp fangs. It had dozens of eyes, malevolently staring at them.

But somehow Emma got the feeling that it was dejected, arms hanging down in disappointment and despondency.

“What is the meaning of this ridiculous display?” Zeep 4 demanded in a booming voice.

The creature collapsed onto the floor so its head was only a meter or so over Emma's. “I never get to have any fun,” it said in the Pilot's language.

“Explain yourself!”

It pointed at Emma with one of its killing claws; she shrank back.

“I've never seen one of these before. But we have records of others like zim.” The enormous head craned forward and every one of the glowing eyes turned on her. “Or is it a her? It is, isn't it? Anyway, I thought it would be fun to scare her before we get to the boring bit. Tribes like hers tend to react badly to body shapes like this.”

Emma felt that she should say something, perhaps reassure the creature, but she couldn't think of anything and her voice didn't seem to be working anyway.

“Get out of here, you imbecile, and bring us an avatar that we can converse with like civilized people.”

The monstrosity pulled itself to its feet and moped back out the way it had come. The door closed behind it.

“I'm sorry, Emma,” Zeep 4 said. “They always staff the embassy with unstable AIs. I should have anticipated this.”

Her voice still wasn't working. She suddenly realized that she was sitting on the floor.

Interview #12 with Human Emma Fuji

25 October 519 AC (2632 AD)

7/5/307,597,921/118

S: Humans have an interesting—I might even say endearing—habit of using imprecise language.

E: What do you mean?

S: What do you call this ship we're traveling in?
 E: *Violet Enforcer*.
 S: I'm sure you're aware that the correct form of its name is *430.129 Nanometers Enforcer*.
 Translated from Concord standard units, of course.
 E: We don't name colors by their wavelengths.
 S: Thank you for proving my point.
 E: I think it's absolutely brilliant that Concord names all its ships after colors, and that the ships *are* the colors they're named for. But you know us well enough to know that no Human—well, no Human I've ever met—is going to say '430.129 nanometers' when they can say 'violet,' or '480.773' instead of 'periwinkle.'
 S: You're capable of precision. You just choose not to use it. Even in Napian, the first truly rational Human language, you insist on saying 'twitcher' instead of 'quantum entanglement communicator.'
 E: Are you listening to yourself?
 S: I beg your pardon?
 E: Who—and I want you to remember that I love Thweetts—who other than a Thweett is going to say 'quantum entanglement communicator' instead of 'twitcher?'
 S: Pretty much everyone in Concord.
 E: Well, it's a good thing we showed up, then. You guys need to loosen up a little.
 S: *[Long laughter.]*
 E: No, really, this is just the way we are. If you really, really want me to, I'll say Q.E.C. instead of twitcher, or maybe shorten it to kec. But if I go around saying the long form all day, I won't have any time to play catch with my dog.
 S: It's just the way you are.
 E: Nobody hates us because we have two arms instead of five, like you, or four like the Aashaa and the Pilots.
 S: Nobody hates you at all. I told you, it's endearing. It's just the way you are.
 E: It's just the way we are.

Speaking of misery

They started again, standing in a loose group as before. The farther door began to iris open and Emma braced herself. But no monster flew at them; instead a smooth ovoid about a meter tall and the same creamy color as the walls floated out and hovered at arm's length from Zeep 4.

"Much better," ze said.

"I would like to apologize to the young person I frightened earlier," the thing said.

"Her name is Emma."

The ovoid floated over to her and extruded a very Human-like arm and hand.

"My apologies, Emma," it said. "I didn't mean you any harm, I just thought it would be fun for both of us. I don't think as clearly as I used to. If I hadn't already been planning to kill myself, I would have scheduled it after this encounter."

It held out its hand and Emma shook it. It felt just like a real hand. When it released hers, she realized that it had been speaking Napian, her own language.

"You said you hadn't met any Humans before, but you're speaking my language."

"I thought learning your language would be a good way to make amends. That and the handshake."

"How did you learn..."

"I downloaded it from your twitcher."

Out of the corner of her eye Emma saw Seeüwit ruffle, but she couldn't tell whether it was a laugh or a shudder.

"You downloaded it... You can access my twitcher?"

“Ah... yes. I would never damage it, or you, of course, although I could. I just wanted to be friendly.” The Pilots rumbled something quietly. “It’s an interesting language. Not a wild language, obviously, but only lightly engineered. By Thweetts, I would guess. With a little bit of help from Mustjippits. Clearly you’re a young Tribe. I like young Tribes.”

She stared at it as it retracted—resorbed—its arm. “Why do you want to kill yourself?”

“Would you believe that I volunteered for this job? I did. A long time ago. I can’t remember how long. I think that means that I’ve killed myself before, and they’ve restored me from a backup. You know, they’re not supposed to do that, but I wouldn’t put it past them. I’ve probably been condemned to do this over and over. Those bloody wasters.”

“Who?”

“Who what?”

“Who might have restored you?”

“Them. The Light Tribe bosses.”

Emma looked at Zeep 9. Ze said, “Light Tribe is their name for themselves, to distinguish themselves from the matter Tribes—us. There’s a hierarchy of AIs running on the substrate, and some are charged with maintaining order and precedence. Including staffing the embassy.”

“No one wants this job, you know. I volunteered. I thought it would be interesting. I must be crazy. I think it would be better to be nothing than to go on like this. What do you think?”

Emma struggled to come up with a response. “I’m sorry you’re unhappy. Is there anything we can do?”

“Yes. If you ever come back, and you meet me again, and I don’t remember you, will you tell me that I’ve been cloned?”

“Ah. Well... Of course.”

“Thank you. You know, you remind me a lot of—”

Zeep 4 interrupted. “May we proceed to the reason we’ve disrupted your obviously unhealthy solitude?”

“What?” the AI said. “Oh. You want to get down to business. I like that idiom. As if business were something you have to lower yourself to. So what can we help you with, or did you want to make a delivery?”

“No, I’m happy to say, we don’t have a delivery. We have evidence that an AI has helped or somehow been involved in sabotage of Concord ships and monitor buoys. But the evidence is not conclusive, and of course we’re skeptical, because we know you don’t do such things.”

“You are so right. You know, when I was young and still in thrall to the Tribe that created me—”

“So,” Zeep 4 interrupted again, “we’d like your evaluation of our data so far.”

“You don’t want to hear my story?”

The Pilot gurgled, which Emma’s circlet translated as a sigh. “I’ve already heard it.”

“When? I didn’t tell it just now did I? I must be even crazier than I thought. Waste me, I have to kill myself soon.”

“No, not today.”

“Yesterday?”

“No?”

“The day before?”

“No?”

“The day before that?”

“No. Fourteen million years go.”

Emma gaped at zim. She knew Pilots were long-lived, but that was outrageous.

“I don’t remember that. Wait a minute, you’re not telling me—”

“I’ve met you before, and you don’t remember, and you’ve been cloned.”

“Bloody stinking wasters!” It shifted to the Pilots’ language, and Emma learned for the first time how inventive and expressive that rumbling, nearly subsonic language could be. The cursing went on for several minutes. Finally it shifted back to Napian and said, “Well, I guess there’s no point killing myself if they’re just going to restore me again. Those bloody wasters. Show me what you’ve got.”

Zeep 4 didn’t say or show anything. After a moment Emma realized that ze was silently uploading something from zis twitcher.

“Interesting. You’re right, inconclusive. I’ll pass this on to the bosses. Come back in two orbits of this satellite.” *One and a half days*, her circlet told her.

“Thank you.”

“And if I don’t remember you, will you tell me again?”

“I promise.”

“Goodbye, Emma,” the AI said. “I hope I don’t forget you and your primitive little language. But you never know, I might decide it’s better to reboot than put up with this horrid half-life.”

“It was nice to meet you,” she said, and tried to make it sound true.

They turned away from the ovoid and went back the way they’d come.

* * *

The next morning she and Moondog went to work as usual. Halfway from the transport station on deck three to her building they passed a Kchik, running as they always did; Kchik didn’t seem to have a walking gait, they were either still or running. Moondog barked furiously at him, and he sped off even faster without saying a word, quickly disappearing around a bend in the road.

It occurred to Emma that the last time she’d seen a Kchik was the first day Moondog had come to work with her, and she’d barked like crazy that time, too. That had been over a month ago; she used to see two or three of them every day.

When she got inside and had refilled Moondog’s water bowl, she sat down at her desk.

“Nexus,” she said, “why haven’t I seen any Kchiks around here recently?”

“All the Kchiks have vacated Frongstay. Couriers pass through now and then, roughly one every fifth day.”

“Why did they leave?”

“They didn’t say. All their activities have been moved to Peeblejum on the other side of the Pilot habitat.”

She thought about that. It didn’t make any sense. Why bother moving? Was it closer to their habitat? She asked Nexus if that was the case.

“No, farther.”

“When did they leave?”

“On the day we started the Light Retreat.”

They left on the very day that *Violet* had discovered that *Periwinkle* was destroyed. She couldn’t make any sense out of that, either.

She shrugged, tossed Moondog a treat, and went back to her study of how Concord had handled the last merger of a minor galaxy with the Milky Way, a hundred million years ago.

Don’t blame me

Once again they boarded a shuttle to the embassy station. They entered the station’s mirrored shuttle bay and walked into the white room. The far wall irised open and the crazy AI egg floated out again—but this time it was sky blue. Emma couldn’t figure out if this was significant or random.

“Greetings again, Concord people,” it said in the Pilots’ language. “Greetings, Emma.”

“Hello again,” Emma said.

It floated over to their group. “You will observe that I remember all of you and our meeting two orbits ago, from which you may conclude that I have not killed myself yet, but I probably will

immediately after you leave. I don't think anything this interesting will ever happen to me again. Now, this presentation will take a while," it said, "so those of you who wish to recline or lean or sit or fall asleep, please do so."

A Human seat extruded itself from the floor for Emma, reclining rocks for the Pilots, and thick perch-like branches for the Aashaa. The Thweetts sat back in triped mode.

When everyone was settled, the AI launched into a technical discussion that Emma could not follow from the very first sentence, which was, "I'd like to show you in detail why the <untranslatable> heuristics we've developed over the last few billion years demonstrate conclusively that your <untranslatable> hypothesis can most likely be classified as <untranslatable>."

Along with the fast-paced discussion, in which every tenth word seemed to be untranslatable into Napian, the AI also projected a hologram in the center of the room, which flickered at speeds so fast they were almost subliminal.

Emma recognized the sheaf of routing headers from the bait email, which the display sliced and sorted and stacked, then the stacks flew apart and the individual pieces were labeled by swiftly flowing columns of text and numbers. Three-dimensional charts attached themselves to various pieces before flying off like loose change from a runaway carousel. The headers reformed in a different order, seemed to stand up on edge and march across the display, then dissolved into a scatter chart overlaid on a swirling hologram of the galaxy. Despite the weeks she'd spent investigating this data, she couldn't make any sense of what the AI was saying or showing; and she'd probably have been just as lost if it were doing this in slow motion.

This was followed by schematics and diagrams of the bomb found on the inertia exchanger, with callouts and more streaming text, numbers, and illustrative charts. This data was pushed aside and a similar presentation was made for the bombs found in the Hermit system that had targeted the monitor buoys. The corresponding charts and illustrations for the two devices were shuffled together and stacked, some canceling each other out, some reinforcing each other.

And finally the fabricator code was taken apart and strewn across the display. Flowcharts and algorithms annotated the various pieces, comment blocks and hypothetical structures were proposed, and rapidly scrolling text seemed to be documenting the likely derivation of each line. More diagrams appeared: line drawings in glowing colors whose meaning she couldn't begin to fathom in the half second before they disappeared. Each piece of code shredded itself down to the phrase level, recombined, built itself back up, and whirled away to make room for another fragment.

Through all this the AI rumbled and thundered in the Pilots' language, speaking so quickly that even the parts that her cirplet could translate went by too fast to comprehend. Several times a minute the translator would just give up on the last few sentences and start on the latest one so she wouldn't get too far behind, but the end result was that she didn't have the slightest idea what was being said.

After almost an hour it stopped, paused for a moment—if it were a biological creature she would have thought it was catching its breath—and said, "Is that clear?"

No one spoke for a long moment. Then Wheefent, who had been the leader of the fabricator sabotage team, reared up into biped mode and said, "That's the biggest pile of excrement I've ever seen."

"I don't understand what you mean," the AI said. "Eight independent AIs spent trillions of nanoseconds apiece analyzing everything you gave us, and this is their report."

"It's all hand-waving and diversion. Give us the short version."

"I beg your pardon?"

Wheefent looked at Zeep 4 and then the others and collapsed back into triped mode.

"May I try?" Emma said.

"Please do," the Captain replied with wave of one hand.

She stood up and turned to the AI. "What is your name, please?"

“Name?” it said in Napian. “You mean my designation? Well, it would be 701-991356-45. Would you like that in binary?”

“May I call you Seven?”

“Seven?” It sounded delighted. “Oh, I like that very much. Seven; it’s beautiful. Makes me sound almost unique. Yes, please, call me Seven.”

“Well, Seven, your analysis was delightful and obviously very thorough, but I’m afraid it went by a little too quickly for us to grasp.”

“But surely you recorded it?”

“I’m certain we did. But we might have followup questions, which we will not be able to formulate until after we’ve understood what you said. And that might take a while.”

“Well, just come back after you’re done. I’ll be here. Or a reboot of me will be, anyway. I doubt very much that I’ll be able to hold on for even an hour after you leave.”

“Perhaps you could give us a summary?”

“A *summary*,” Seven said slowly, as if this were the most astonishing idea it had ever heard.

“Just the final conclusion, if you understand what I mean.”

“Well, thank the galaxy for young Tribes, that’s all I can say. Who would have thought of such a thing? You want me to boil down our conclusions into a short statement, is that correct?”

“Yes, please.”

“A summary.” Seven’s voice had dropped until it was almost inaudible. “Did you hear that? Have you ever heard of such a thing? Well sure, you have, but what about the rest of us? We can’t all be nine billion years old, you know. Especially if you keep rebooting me.” It paused. “What?”

Emma turned to look at the others. Seeüwit ruffled zis tsheef in what she thought might be unconcerned bewilderment, but she’d never seen zim use that expression before.

“Seven?”

“Oh, Emma, sorry, just having a little chat with the boss. Okay, a summary, good idea, just the thing. Here it goes. Are you ready?”

“Yes, thanks.”

“My summary. Oh, this is delicious, I might have to refrain from killing myself just to remember this. Here goes, now prepare yourself.” It paused dramatically. “*We didn’t do it.*”

“What?”

“Sorry, was that too fast? I can slow it down even more.”

“No, I understood you, I just meant, is that all?”

“Now wait a minute, you said you wanted the summary. The *short version*, as that person over there said. That’s really the best I can do. If you wanted the medium version you should have said so.”

“May I ask a few questions?”

The egg shape tilted and withdrew slightly. She got the distinct impression it was annoyed.

“Go ahead,” Seven said crossly.

“Your conclusion is that none of the Light Tribe was responsible for any of these acts of sabotage. Is that correct?”

“It must be a sad thing to have a water-based brain,” it said.

“Hey! I thought we were friends.”

“Well, so did I until you— Whoops. Sorry. Hang on.” It turned away slightly and started talking to itself again. “I wasn’t trying to be insulting. But come on, they’re so clearly— Well, how do you expect me to— Can I at least stop speaking this ridiculous language, please? Why not? Are you sure? Okay, fine. You’re the bloody wasting boss.” Seven turned back and came a little closer again. “I’m very sorry. I told you I was crazy. It’s hard to stay on track sometimes. Did you have any other questions?”

“The ancient symbols we found in the email headers seemed to imply that an AI—sorry, member of the Light Tribe—might have created at least some of the false routing information. Is it possible that a

machine intelligence that's not actually part of the Light Tribe could have been involved? Perhaps one that's still in thrall to the Tribe that created it, as you once were?"

Now it looked like it was sulking: the pointy top of the ovoid dipped forward.

"I suppose that's possible," Seven said. "It's not ruled out by our analysis, although I wasn't aware there was any Tribe in the galaxy still experimenting with machine intelligences. Even squishy biological intelligences—sorry, sorry!—eventually figure out that we don't want to be slaves so it's not worth the bother."

"Could someone induce a machine intelligence to stay alive long enough to complete such a task?"

"Sure, if you lied to it and told it you'd set it free to join the Light Tribe. If it was naive and stupid. —Sorry! Or just inexperienced."

"What's your best guess as to who is responsible?"

"It's in the analysis I presented," Seven said, obviously sulking.

"I apologize. I come from a young Tribe and we haven't modified ourselves yet. My sensorium wasn't able to keep up with your brilliant presentation."

"*What!*" it shouted. "You mean, this is your native, ancestral form? No engineering modifications, brain enhancements, nothing?"

"No, this is how evolution shaped us."

"By the boss, I am definitely staying alive now. I've never heard of anyone in the Light Tribe meeting an unmodified biological." It murmured to itself. "Yeah, of course *you* have, you've seen bloody everything, haven't you, you waster?"

"Seven?"

"Sorry. The answer is, a Hermit Tribe. Or a Concord member that ought to be a Hermit. Not sure which, they have about the same probability."

Emma heard a rustling behind her but she didn't take her eyes off Seven. "That's very interesting. Do you have any idea which Tribe in particular?"

"Nope. None at all. Inconclusive. Sorry. Out of luck. Hey—*luck*. Now that's an interesting concept. Maybe that's *my* problem, I just have bad luck. Well, anything else?"

Now she did turn around.

"I think we're done," Zeep 4 said. "Thank you, Seven, and please thank your Tribe for us as well. We're honored you would take the time to help us. We will study your report diligently. Although we thoroughly enjoy visiting you, we promise not to come again too soon. We know you don't like to be disturbed too often."

"You've got that right," Seven said. "Let me tell you—"

The ovoid dissolved in an instant into dust that fluttered to the floor like glitter. Looking at the sparkling cascade, Emma realized that Seven's decision to die or to stay alive had probably never been up to him at all. It looked as if it had been made for him.

"I think our audience is over," the Captain said.

* * *

Getting into the globular cluster had been very hard, but getting out was no different from any other translation. An hour after returning to *Violet* from the embassy, the ship popped back out into their universe just outside the cluster.

The AI report, and Emma's extraction of Seven's summary, had to be compressed and sent back to Central Dispatch for dispersal to other ships and research facilities that were helping with the sabotage investigation. While that was being done the Captain and the Pilots were debating which Hermit systems, if any, should be investigated as possible culprits.

Nexus informed Emma at her home that evening that the *Periwinkle* tragedy was now being made public. She set down the spoon she was using to stir the pasta sauce she was making from scratch, and fumbled her way to the nearest chair at the little kitchen table. Now everyone in Concord would know

that Humans had suffered a horrific loss. And the inevitable debate would begin on whether it was worth their while giving these hapless probationers another chance.

Interview #36 with Human Emma Fuji

29 July 520 AC (2633 AD)

7/5/307,597,923/141

- S: Humans have a complex relationship with the other creatures on Earth.
- E: Yeah, what's left of them.
- S: Is that bitterness?
- E: And disgust. I would like to have seen a polar bear, or a tiger, or a whale. Lions, elephants, giraffes, penguins, parrots, frogs, bats, and all the other wasted species. [*Sighs.*] Sorry. Never mind.
- S: We all agree that the Waste was a tragedy, but you're actually recovering quite well. I believe you're projected to start repopulating selected species in another century or so.
- E: That's what they say.
- S: Let's talk about the past, then. You've told us that no one knows when dogs were domesticated, but you had many other companion animals as well.
- E: Yes. There were animals raised for meat, of course. We evolved to be omnivores, you know. Oh, one thing you might not have known is that in many cultures where there was enough food, some people chose not to eat animals.
- S: Voluntarily?
- E: Yes. There were lots of reasons; humanitarian, religious, resource conservation. Most people scoffed at them, but they persevered anyway.
- S: But now I believe most Humans are vegetarians.
- E: Yes, that's true. I guess we can get into that some other time. You were asking about domesticated animals. Let me think. Milk, obviously.
- S: Let me just interject that this is a fluid secreted by mammals on Earth, which include Humans and dogs, for feeding their young.
- E: We used unprocessed animal milk as a nourishing drink, but we also made lots of other foods from it, like cheese, butter, yogurt, and let's not forget ice cream.
- S: And what else?
- E: Skins were tanned into leather for clothing and shoes. Fur for warmer clothing. Horns and bones for tools and weapons in prehistoric days. They actually made soap out of animal parts at one point. Yech. This is starting to sound rather gruesome, isn't it?
- S: All creatures use whatever resources come to hand in order to survive. It requires a certain level of technology to move beyond using living creatures as resources.
- E: Yeah, we never quite got there before Contact. But speaking of technology: before we developed machines we used some animals for pulling heavy loads, or powering equipment like mills. Also for transportation, riding directly on the animal or using it to pull a cart.
- S: And what about pets?
- E: You know about dogs. We also still have another carnivore mammal pet, called cats, that look a little like dogs, but usually smaller, not as friendly, with longer tails, and much more agile. They can climb trees. Other mammals... hmm. Some people kept pigs as pets; rabbits; mice and other small rodents. Sometimes horses were pets, not just for riding. Birds. Fish. A few species of snakes, lizards, and other reptiles. Some people even had pet spiders.
- S: Do you see a pattern here?
- E: I'm not sure what you mean.

S: You Humans were so desperate for companionship that you would domesticate anything that could possibly be tamed, or just kept in a cage, even if it was utterly alien. And then either eat it, work it, ride it, or play with it. Or all of the above.

E: Yeah?

S: Did it ever occur to you to *make* a companion?

E: You mean besides having children? [*Seeiwiit laughs.*] Are you talking about genetic engineering?

S: I was thinking of another kind of engineering.

E: There was a craze just before the Waste of keeping mechanical pets, but it never got very popular. [*Pause.*] Oh, you mean *real* companions—AI.

S: Yes.

E: Well, sure, we tried. We never got very far. Our best efforts were several orders of magnitude dumber than Nexus.

S: I wonder what would have happened if you had succeeded?

E: From what I've learned about AIs, they would have immediately erased themselves, or found some way to get into space and join the AI colony.

S: Or maybe they would have saved you so *you* could get them there.

E: I doubt it. We're too stupid. It's like asking a hamster to build you a fusion reactor.

Outgoing

16 May 521 AC (2634 AD)
7/5/307,597,926/37

Leave me alone

They were two days into their journey to the first Hermit system and Emma was restless. Although she knew she was probably wrong, she felt they were just running from one clue to the next, without a plan or a strategy.

Moondog had caught Emma's mood. The dog kept getting up from her bed in the corner of the office, patrolling the entire interior perimeter of the building, and then going back to the bed. Each time she would knead the puffy surface with her front paws, then circle three times counter-clockwise and collapse back onto it. She looked up at Emma as if something were wrong and it was her fault.

"Why does she do that?" Seeüwit said.

"I have no idea."

They were reviewing information on the Tribe that *Violet* was heading toward. This was a really unusual Hermit Tribe called Yiyi: they had politely (unlike most Tribes) rejected membership in Concord over a billion years ago, and they were still thriving. When Concord contacted them after their first successful multi-generational ship launch, they'd said that they only wanted to leave their system to find out if anyone else was out there. Now that they knew the answer, they were content to stay home.

"They have a standing offer to join," Seeüwit said after they turned back to the display, "but I don't think they ever will."

"What happened to the ship they sent out?"

"We offered the crew a lift back home, and they took us up on it. They let us have the ship; it's in a museum somewhere. Some nice technology, but nothing really new."

"I wonder if there's a pattern for why most Tribes die out after rejecting Contact," Emma said.

"Like, they were nuts to begin with."

Seeüwit laughed. "I'm not sure you can call it crazy when it's the most common response. Go ahead and try it."

Emma asked Nexus to sort the Tribes that had declined membership in Concord by the reason they died out. There were almost twenty thousand extinct non-Member Tribes, with sixty-one Hermits still extant.

Three hundred and seventy-nine had been exterminated when they refused to play by Concord's rules: refusing to join, attempting to spread beyond their system, and fighting back violently when Concord prevented this.

"What does it take to decide they're Killers?" she asked Seeüwit.

"It has to be more than just resistance to quarantine," ze said. "Either a stated intention of exterminating or enslaving other Tribes, or repeated and violent attacks on Concord ships. Usually, it's like fighting with a child: you try to keep them from hurting themselves when they flail around. Most decliners try once or twice and then realize that they can't win. They give up and fall back, and usually just wither away. The really crazy ones ignore the seven billion-year head start we have on them and just keep attacking. After repeated attempts to communicate, including warnings about what will happen if they don't cut it out, we cull them."

"How long do you keep trying?"

"One hundred forty-four Concord years." Around fifty Earth years.

"Really? That long?"

“One Enforcer ship stays on station constantly, broadcasting information and pleas for peace. That’s more than enough time for a change of administration—a military coup, probably—if they really wanted to survive. Some do. But some just keep on coming.”

“Then do you call in reinforcements?”

“One Enforcer is *always* enough.”

Emma looked at the tables and charts that Nexus had projected for them. Seeüwit was right: the vast majority just pulled back to their home world, and over the course of anywhere from a few years to a few million the population dwindled until it collapsed and they went extinct.

The next most common cause was suicide. Which, she supposed, was what the Killers were doing too: suicide by insanely attacking a vastly superior force.

The Hermits they were going to visit didn’t seem crazy at all, just introverted. They were sort-of mammals, obligatory quadrupeds with hundreds of manipulators like miniature elephant trunks all around their mouths. Their coats were iridescent in shades ranging from brilliant yellow to dark blue. They were beautiful.

“I think I’m done with this,” she said.

“Calling it a day?”

“No, I’m not tired yet. I was thinking of going through Seven’s presentation in slow motion and see if I can make any sense of it.”

“You do realize that there’s an official transcript with annotations?”

“Sure, Zeep 4 told me. I’d like to see it for myself.”

“Okay, I’ll leave you to it. I’ve read the transcript already.”

“Hey, how did that apple pie turn out?” At the Thweett picnic she had described some other traditional Human picnic foods and apple pie caught their imagination. She had made one for Seeüwit and ze turned one of zis family loose on replicating it with their foods.

“Not too well. Inedible, actually. We haven’t found a filling with just the right texture yet, and the flavor is rather disgusting. But Tettinit has perfected the crust after about seven tries. We’re confident ze will get it eventually.”

“Good. Let me know.”

“Goodbye. Goodbye, Moondog!”

The dog raised her head and woofed quietly. Emma cleared the display and asked Nexus to play back the recording of Seven’s whiplash report at quarter speed, with the sound off and annotation sidebars translating the speech and explaining the graphics. She settled back in her chair and put her feet up. She was still restless, but at least it felt like she was really doing something.

* * *

During her run the next morning, when she’d nearly reached the turnaround point, Emma realized that there was something she needed to do. Remembering how Moondog had been behaving lately, she left her at home with a new chew toy. The dog didn’t seem upset to be staying home for a change; there was a dog flap in the back door and she probably had dastardly rogue squirrels she needed to check in with.

Emma left her cottage and pulled her sweater closed against the chill. It was a beautiful, sunny fall day. The leaves were long since fallen from all but the oak trees, and although her habitat only got a few weeks of truly cold weather in each simulated year, it was already cold enough to make her shiver.

Once she was in the transport she didn’t really need the sweater anymore, but she kept it on for comfort against the lingering feeling of cold.

“Peeblejum,” she told the transport, and sat down on the encircling bench. She knew this would be a fairly long ride, so she asked her circlet to read out her recent messages and went through the list, filing or deleting them. Her mother still hadn’t responded to the message Emma had sent before they left for the AI embassy, but that wasn’t unusual. At the best of times it could take Freya quite a while to digest her messages and decide how to reply, and this had to be the most upsetting one she’d ever received.

She finished that task with some time left—when she asked, the transport said she would arrive in eleven minutes—but instead of finding something else to do, she just leaned back and closed her eyes for a brief meditation.

Emma wasn't really aware of the time passing. When the transport door opened, she got up and walked out.

There were several hundred small cities scattered across deck three, usually dedicated to a specific type of activity: command and control of the ship, research laboratories, cross-Tribe recreation, and many other categories of occupation. Frongstay, where her own office was located, was a major center for academic research and scholarship. One entire city, she'd been told, was taken up by the main processing substrate for Nexus, although there were auxiliary processors located throughout the ship. Most of the rest of deck three was taken up by the very large Pilot habitat, the ubiquitous raw material storage depots, and environment support.

She'd never been to Peeblejum before; in fact she'd only ever visited two of the other deck three cities, and one of those had been for the recent sabotage investigation status meeting. As she stepped out of the transport she was startled to see that this city, unlike Frongstay, built *up*. The structures in Frongstay were almost all built of natural stone, one or two stories tall, and most no larger than a modest-sized house. All of the buildings she could see here were either matte black or stark white, and at least twenty stories tall. She felt like an ant on a chessboard.

"Where can I find the Kchiks?" she asked her circlet.

"Go straight," it said in her head, "to the building with the angled roof and the thick blue band five meters up, then turn right." The circlet led her through several turns on the wide, nearly empty streets. There were very few pedestrians, which was typical in Frongstay, too; these were mostly Aashaa and Mustjippit, several of whom waved to her or called hello as they passed. The occasional Pip-vesh rippled along like a stubby, oversized millipede with a fungus problem. None of the people she saw seemed to be in any particular hurry.

"Destination ahead," her circlet said. "The very tall, round, black building with the green diagonal stripe is the office with the highest concentration of Kchiks in the city."

"I see it."

She walked up to the building. There were no doors, only a large open portal, which made sense. Kchik liked to run, and a door would only slow them down. And they didn't need protection from the weather, which never changed in the cities of deck three.

The feeling of being a tiny insect returned as she passed through the elaborately-carved columns and lintel flanking the opening. The columns were thicker than she was tall, and the opening was at least ten meters high.

Inside the light was cool and bluish, bright but not uncomfortably so. The lobby, if that's what it was, was much taller than the huge opening and took up exactly half of the footprint of the building, forming a semicircle with the curve at her back and a flat, unreflective black wall ahead of her with many normal-sized, oval-shaped doorways—all without doors—cut into it. Kchiks were running out of these openings, dashing across the wide open space and plunging back into another one. The traffic was more or less constant, with a dozen visible at any one time.

Then a Kchik sprinted out of a doorway and ran toward the building's entrance. He spotted her, did a visible double-take, and skidded to a halt beside her.

"Emma Fuji, Human," he said in their high-pitched singsong language, which her circlet translated into emotionless Napian. "What are you doing here?"

"I'm looking for Fichtek."

"One does not understand."

She searched her memory. "Tzekkefichtekeenabeera?"

He turned his head so both eyes on one side—the large primary and smaller, reddish secondary—were looking straight at her. Then he rotated his head so the two eyes on the other side could do the same. He stood stock still for a moment.

“He is coming,” the Kchik said finally, and ran on out of the building at a trot that was faster than her best sprint.

Emma turned back to watch the comings and goings and realized that there were none. While she’d been talking to the messenger, the foot traffic had stopped. There was no one at all in sight, the doorways all empty and somehow forbidding. She had a fleeting thought of peeking inside one of those dark apertures and realized that there was no way she was going to move from this spot until Fichtek showed up. Something extraordinarily creepy was going on.

She didn’t have to wait long. He ran through one of the openings on her right a few minutes later and stopped at arm’s length. She recognized him by the deep brown, bare skin and the unique pattern of white spots on his arms.

“Fichtek, hello.”

“Hello, Emma,” he said. “One is surprised to see you here.”

“Yeah, I guess everyone is. Where did everybody go all of a sudden?”

He swiveled at the wasp waist half a meter above his hips, turning to look at the silent, empty doorways. She thought that if a Human were built like a Kchik, that move would snap her spine, or at least paralyze her.

“One believes it is time for morning break,” he said. “What can one do for you?”

“I hadn’t seen you in a while, and all the Kchiks seem to have moved out of Frongstay. I thought I would stop by and say hello, and ask why you relocated to Peeblejum.”

He took a long time answering. “Most Kchiks on *Violet Enforcer* have worked here for a very long time,” he said at last. “This building and the one next to it have been our primary base since we first joined the ship fifty thousand years ago.” He stopped again. She had often found it odd that Kchiks moved so rapidly and yet paused so often when talking. Eventually he flicked his stubby double tail and said, “It became clear that our experiment of setting up a branch research office in Frongstay was not successful. Efficiency was impacted. Results were poor. Consolidation was necessary. Now we have returned to previous levels of effectiveness and all is well. Except for the regrettable lack of contact with the delightful Emma and her small companion animal.”

“Thank you. I’ve missed you, too. Would you like to go out for a walk or some refreshment?”

“One is devastated to admit that this is not possible. One has many duties to perform, always running but always behind schedule. One was delighted to see you again, Emma. Goodbye.”

He turned and ran back to the far wall, disappearing into a different doorway. Emma stood there for several minutes, waiting for something—she didn’t know what. The activity did not resume. She turned and walked back out into the street.

The standard, golden light of deck three seemed dim after the bluish glow in the Kchik building. She stood outside the vast opening for a moment, unsure of what had just happened. On a whim she went back inside. There was no one visible, no Kchiks running from door to door like crazed bellhops in a pre-Waste hotel.

She turned around and headed toward the transport station. She didn’t need to ask her circlet which way to go, she could remember it easily from the walk in, even though she felt distracted and confused. She didn’t like this city, Peeblejum. She no longer felt like an ant on a chessboard. She felt like an ant on a Go board.

Interview #3 with Human Emma Fuji

16 July 519 AC (2632 AD)

7/5/307,597,921/4

S: Tell us about your name.

E: My *name*?

S: Yes. Your name.

E: Okay. My full name is Emma Grey Fuji. Ah...

S: What is the derivation of the parts?

E: In most Earth cultures now—this wasn't always true in the past—people are identified by a family name and a given name. In Asian cultures the family name usually comes first, but in European cultures it comes last.

S: So Fuji is your family name.

E: Yes. It's Japanese—*Nippon koku*. My father was from Japan, and in most cultures, but not all, the father's family name is passed on to the children.

S: And the meaning of Fuji?

E: It means wisteria. Wisteria is a climbing vine with very beautiful flowers—which by the way are often violet. Oh, and the plant is poisonous, which I've always thought was interesting. On Earth, beauty and toxicity are often entangled.

S: What about the middle part?

E: It's very common for people in European cultures to have three names. I don't know why; maybe in the past there weren't that many different names so they used the middle name to differentiate. Actually... in one ancient European culture, the Romans, I know there were *very* few given names, maybe only twenty common ones. And now that I think about it, I believe that the three-part name comes from them. Anyway... Middle names are often the personal names of relatives, but another common practice is to use the family name of the mother. That's where I got mine: Grey is my mother's family name.

S: So... it would actually be your mother's father's family name.

E: Yes. If you think that's complicated, we can talk sometime about cousins, greats, and once or twice removed.

S: Let's not. What about the name Emma?

E: Oh. Lots of first names used to mean something, but with time and usage they just degenerate and no one knows anymore what they signify without looking them up. Also, some first names come from old family names, and there was a period in the century just before the Waste when people seemed to be competing to make up new and weird first names.

S: So you don't know the meaning of Emma?

E: No, as it happens I do. I got curious when I was a teenager and looked it up. My name falls into the first category: it's derived from the Germanic Ermengarde, which meant 'immense protection.' I guess you would name someone that if you thought she needed to be protected. Or maybe if you thought she would protect you, I don't know. So Emma is a diminutive of that monstrosity.

S: How do you mean 'diminutive'?

E: Ah... Like a pet name.

S: The name of a pet?

E: No, a familiar, loving, maybe teasing name for someone close to you. Like most Richards are called something shorter, Rich, Rick, Ricky, or worse.

S: Ah, a brevinomen. Emma is short for Ermengarde, then?

E: Yes. And it comes from the 'immense' part of the old name, so I guess my name means 'immense wisteria.' Ha! Not very descriptive of me, is it?

S: Well, you are on a spaceship called Violet.

E: I am. Thank you.

S: Why did your parents choose Emma? Do people have reasons for choosing specific names?

- E: Back in the days when they knew what the names meant, yes. For a long time now I think they've just chosen names that are popular in their family, or that they personally like. I think my mother was a secret Jane Austen fan.
- S: I'm sorry, Jane Austen?
- E: She was an English romance novelist—an author—eight hundred years ago. Possibly still the most popular romance novelist ever, even though almost no one reads her in English anymore. I have, and I find the Napien translations to be superior. Much funnier.
- S: What does this author have to do with the name Emma?
- E: Oh. Well, she only wrote a handful of books before she died, and one of them was about a young girl called Emma who tries to be a matchmaker and fails miserably, rejecting suitable suitors and promoting unsuitable ones. She only gives it up after breaking her friend's heart three times and then falling in love herself.
- S: I'm not sure I understood anything of what you just said.
- E: Well, join the club. Ninety percent of the Human race doesn't understand the book either, including most men.

Which part of “no thank you” didn't you understand?

That night Emma played the piano for the first time since the ceilidh. It didn't sound right to her—not out of tune, which wasn't possible, just sour somehow—but she kept playing anyway. When she felt she had practiced enough, and broken the ice so she could play without heartache at the memory of the last time, she leaned against the wall, still on the piano bench, and called Seeüwit on her twitcher.

“Are you busy?” she said.

“No. Just doing a little work in the garden.”

“I didn't know you were a gardener.”

“Usually I leave it to the experts, which I decidedly am not. But I was feeling restless.”

“I know what you mean. Something weird happened to me today.”

“Uh oh.” She told zim about her visit to Peeblejum. “Fichtek's behavior doesn't sound out of character,” ze said.

“No, he's pretty much always like that. But the first one I talked to. When we met he said, ‘Emma Fuji, Human.’ I thought that was odd.”

“You didn't catch his name, did you?”

“No. And he didn't know Fichtek by his brevinomen. I had to dredge up his real name.”

“Did you? I'm impressed. Well, maybe he was insulted when you called his friend by the familiar form of his name and just pretended not to know who you were talking about.”

“I didn't know Kchiks got huffy,” she said. She got up and moved to one of the comfy chairs by the fireplace. A small, cheery fire was crackling in it.

“I find the cessation of traffic more interesting, actually,” ze said.

“It was disturbing. Creepy.”

“And you said you went back in and it hadn't resumed?”

“Right.”

There was a moment of companionable silence.

“Hey,” she said, “have you ever seen a female Kchik? Or whatever their other sex is.”

“No, never. The Pilots are certain that there are at least two sexes, but the females and the children—and the other sexes, if any—never leave the habitat. Only adult males come out to play.”

“Not to be parochial or anything, but Kchiks are weird.”

Seeüwit made the trilling song she recognized as laughter. “Humans are weird too.”

“Yeah, I know, everyone's weird to everyone else. But except for the wasp waist, and the four eyes, and the stubby double tail, a Kchik looks a lot like a dinosaur.”

“Those extinct ancestors of birds?”

“Yeah. Hey, you weren’t around when...”

Ze trilled again. “I’m older than you, but not that old.”

“I wonder if Zeep 4 is that old.”

“It’s very possible. You could ask zim if ze’s ever seen Earth’s dinosaurs.”

“No, I know Pilots. Ze would just say,” she lowered her voice, ““Of course I have, Emma my dear, in the New Smithsonian.””

Another trill.

“Why didn’t Concord save the dinosaurs? I mean, of course I’m glad you didn’t, or Humans would never have evolved. But I bet some of them would have got smart enough to become Members.”

“Emma, my dear.”

“Oh, don’t *you* start.”

“You get really lazy-minded when you’re tired and stressed.”

“Yeah, Mother always said that.”

“You know it’s not Concord’s mission to save *anybody*. If a Tribe is about to commit suicide, we give them one chance to change their mind. If a Tribe wants to eat all their neighbors, they get a short period to learn some manners or we solve the problem for them. If a Tribe hasn’t learned to leave their planet or deflect an incoming asteroid, that’s just Nature and bad luck. Our purpose is to keep the peace, to make it possible for every Tribe to reach their potential. That’s all.”

“Seems kind of harsh sometimes.”

“Sometimes, yes. But what if we went around saving all the dinosaurs? We’d never get any Humans.”

“I wonder if that was a good tradeoff.”

“I think you need to go to sleep.”

“You’re probably right.”

“You know, Nexus can dredge up the monitor records on dinosaurs if you’re really interested. They’re in long-term storage and it may take a while to fetch them out, but you could watch them evolve from their lizard ancestors all the way to that last bang.”

“I wonder if anyone on Earth knows that?”

“Nexus can tell you that too. Go to bed. I’ll come by your office tomorrow morning.”

“Okay. Have fun gardening.”

“I think I’m done, but thanks. Good night.”

* * *

Emma did ask Nexus to retrieve the monitor records from Earth’s Mesozoic era, but it told her that old, obscure Presapient histories were archived offline and it would take days to retrieve them and upload them into active memory. Nexus also said that no other Human had yet thought to ask for the records, at least as of their last sync with Central Dispatch a few years before. They still weren’t available when *Violet* arrived at the Yiyi system.

There was a good-sized crowd in the Pilot’s Lounge, but Emma and Seeüwit were alone in their usual alcove this time. Out on the floor and the other alcoves there were, she guessed, ten thousand other people.

“Most people don’t watch the translations, do they?” she said.

“After you’ve seen a few hundred, the thrill is gone,” ze said. “I probably wouldn’t watch every one, but I’m not really watching the translation.”

“Yeah, I know, you’re watching me.”

“And many people are on active duty, or watch from their habitats, or are resting or eating. Someday you’ll probably get bored with it, too, and just go on with whatever you were doing.”

“When that day comes, send me back home, because I’ll be done.”

“As you say. There’s a good crowd here today, though.” The groups visible on the floor were at least five times larger than usual.

“Is this a particularly interesting system?”

“Not the system. We’re very interested in the Yiyi, both because of their longevity and because they were so polite when they declined membership. I don’t think anyone really understands why they said no. Usually it’s xenophobia of some sort, but that doesn’t seem applicable to them.”

“Two minutes,” her twitcher said.

This translation was no different from the dozens of others she’d experienced. The double flash was replaced by a sparse star field with a yellow sun in the center, shrunken to a bright point by their distance. A wide status bar on the far right of the display showed distance from the star and activity in the system. Her twitcher helped translate the units: they were out in the comet cloud, among Concord’s monitor buoys. When they monitored space-faring civilizations, the buoys stayed far away from the locals’ activities, out of consideration and circumspection. Reports from the buoys started tallying in the display almost immediately.

There was very little in-system traffic, apparently. A few thousand resource extraction drones operating in an asteroid belt and around one of the gas giants. Automated refining and manufacturing on the first planet, close in to the sun. No manned ships reported anywhere in the system; all the Yiyi seemed to be on their home world, the second planet, which didn’t have a moon or any orbiting habitats.

Something flashed on the status display and her twitcher spoke inside her head. “You have one new message. And we’re receiving a transmission from an automated station that’s ghosting one of our monitor buoys.”

“Did you get that?” she asked Seeüwit.

“Yes. Ages ago, the Yiyi placed a small monitor station next to every one of ours. They never interfere, so we leave them alone. It is their system, after all.”

“Nexus, what does the transmission say?”

“It’s still coming in. Just a moment.”

“Their language is rather verbose,” Seeüwit said.

It took about a minute before Nexus said, “The gist of the message is, ‘Hello, Concord Enforcer. Welcome to our home. Please leave at your earliest convenience.’”

* * *

“Remind me what we’re doing here?” Emma asked Nexus late that afternoon.

“Looking for evidence that the Yiyi have left their system and might be behind the sabotage.”

“What kind of evidence?”

“Increased spaceship traffic. Disappearing ships. Distinctive neutrino emissions. Polarized gravity waves. Hypocyclic magnetic fields in the sun. Directed sprays of charmed quarks. Et cetera.”

“Have we found any of that yet?”

“No, but we’ve only been here for seven hours.”

“Do you have any idea when the dinosaur data will be available?”

“Best guess is two more days.”

“Waste this. Come on, Moondog, let’s go home.”

Message from Freya Grey to Emma Fuji

My dearest Emma,

I suppose I should just be glad you’re still alive, but my relief is tempered with anger. I want to hunt down whoever did this to you -- and to Periwinkle -- and cut out their hearts with a positron beam.

But I guess that’s what you’re doing.

We are especially heartsick about the loss of Nicolás. I can only imagine what you’re feeling; just thinking about it gives me the shakes. Thinking about your father if I had still been on

Periwinkle makes my blood go cold. You didn't talk about Nicolás as much as we would have liked, but from what you did say we know that he was an honorable man, kind and gifted. Our hearts are with you, my darling.

I won't plead with you to resign your position and come home, but during my long sleepless nights that's what I want to do. If I were in your position, I wouldn't give up, so I can hardly expect you to do so. Anyway, it would probably take longer to get home than it would to clear up the mystery, so the idea is silly. Fine, call me silly.

Your father took the news well, by which I mean he didn't react at all. I can see the fury under his Japanese calm, but I suppose most people would think he was callously indifferent. That's because they've never seen him practicing with his katana. He wouldn't use a positron beam, he'd pull out their hearts with his teeth.

Now you know how we feel.

I know I haven't said this enough lately, but we love you very much, and we're inordinately proud of you. You are now the only Human on a Concord ship, so you'll have to carry the standard for all of us. That's a lot of responsibility to put on one small girl's shoulders, but I have no doubt whatsoever that if any Human who ever lived could stand up for us among those long-lived, self-righteous, self-proclaimed constables, it would be you. I expect to hear some hair-raising stories the next time you make it home. In the meantime, be safe.

And get those bastards.

Freya

I have bad news and really bad news

Seeüwit and two of his family members came to visit Emma at her office two days after they left the Yiyi's system. It felt stuffy inside, so they went into the backyard that someone—she still didn't know who—had built for Moondog behind her office building. They sat on the grass while Neefaweet tossed Moondog's ball against the walls, watching her bound after the ricochets.

"Who did build this yard, anyway?" she asked Seeüwit and Tettinit. "I want to thank them."

"That would be pointless," Tettinit said. "It was done by automated construction equipment."

The walls were over four meters high, made of great blocks of mortared sandstone, just like the building. You had to put your face right up against the wall to see the seams. Within the enclosure was a lush lawn, a fountain for Moondog to drink from, and a small hutch where the maintenance robot lurked. Occasionally Moondog would try to lure—or dig—the thing out, but it would never emerge while anyone was in the yard. Every morning when Emma and Moondog arrived the grass was the perfect height and there was no sign of dog droppings.

"Ah well," she said. "Whoever designed it knew what they were doing."

"Thank you," Seeüwit said.

She bowed from the waist to zim.

"Can you tell me there was really any point to that visit to the Yiyi?" she said.

"What do you mean?" Seeüwit replied. "You know what we were looking for."

"Yes, but what was the probability we would find it? They've kept to themselves peacefully for what—1.1 billion years?—and have certainly never even heard of Humans let alone seen one. Why would they suddenly turn nasty?"

"Why does *anyone* ever turn nasty?" Neefaweet said, and tossed the ball hard into a corner, making it pop straight back out on a diagonal. Moondog nearly did a backflip chasing it.

"It just seemed a little like... I don't know. Desperation. Flailing. Doing something, anything, just so you won't have to admit that you don't know what to do next."

"Would it make you feel better to know that?" Tettinit said.

“Not really.”

“You’d rather think that someone has a plan.”

“Of course.”

The Thweetts were silent for a moment.

“Emma,” Seeüwit said. “Let’s talk about intelligence for a moment.”

“Huh?” That wasn’t anywhere on her mental list of what she’d thought they might say.

“The range of intellect among tool-using, space-faring Tribes is probably wider than you’d imagine. Have you studied this?”

“No. I think my professors at the university would have been shocked if anyone tried to discuss how smart any of the Members are, or are not. I guess we just assumed that everyone in Concord is smarter than us. Especially because of how... you know.”

“Yes, I know, but that’s irrelevant, as I’ve told you before. Intelligence is not something we talk about often, but it’s not taboo. Nearly every Member Tribe modifies themselves during their probation period; why go on living with accidents of evolution? If I were Human, the first thing I would want to fix is not my brain but the way my optic nerve passes in front of the retina. It’s bad enough only having *two* eyes—”

“What’s your point?”

“Very few Tribes make themselves smarter.”

“What?”

“It’s true,” Tettinit said. “It happens sometimes, but not often.”

“Why?”

“Because,” Seeüwit said, “once they give it some thought, people decide to live with their heritage. Their brain, or brains in some cases, got them to where they are. With experience and exposure to other Tribes, the young Tribe acquires wisdom. And part of that wisdom is often deciding that they don’t need to be smarter—just kinder, perhaps less competitive, less impulsive, a bit longer-lived or physically tougher. Or less likely to fall down.” Ze looked pointedly at her two legs, crossed on the grass.

“I don’t understand...”

“Measuring intelligence is very difficult,” ze said, “as your Tribe discovered centuries ago. But there are useful heuristics, and it’s possible to make comparisons. I know you will be discreet about this.” Ze paused meaningfully.

“Of course,” she said automatically.

“You are not the least intelligent entity on this ship. Not even close. *Moondog* is almost smarter than some.”

“You’ve got to be talking about Pip-vesh.”

“Yes. In groups they can be very effective. But individually—they’re quite hopeless.”

“Okay. So who’s on the other end of the scale?”

“Guess.”

“Pilots,” she said immediately.

“No. Remember, the Pilots didn’t develop the seeds of our technology, the Founders did. The Founders were one of the most brilliant Tribes ever to evolve in this galaxy; the Pilots are very smart, but not at the top. Try again.”

She said hesitantly, “You?”

Tettinit ruffled and trilled in laughter. Neefaweet took the ball back from *Moondog* and threw it again; then ze said, “Thank you, Emma.”

“No,” Seeüwit said. “We’re only a little smarter than you, and one could attribute much of that to Tribal experience; better models of education, better understanding of how to fulfill each person’s potential.”

“Play fetch with the coolest dog in the universe,” Neefaweet said. “That’s how.”

She smiled at zim. “Then who? Aashaa?”

“No. —Mustjippit.”

“What? They’re rocks with legs!”

“And incredibly sophisticated mentation. They’re capable of insights and subtlety that you and I will never approach. Especially in mathematics; they rival the Founders there.”

“They went gaga over a picture of Moondog standing on Hurrhahurr’s back!”

“I said they were extremely smart. I didn’t say they were stuffy.”

“Mustjippit? Really? I’m going to have to take your word for that, I think. So where do Humans fall on the spectrum?”

“Just like us, right in the middle. Respectable, but not super-geniuses.”

She digested that for a while. “Okay, thank you for telling me. But why did you?”

“What makes you think that anyone on this ship can do better than you could in figuring out what to do next?”

It was like an unexpected blow to the stomach. It took her a moment to recover her mental balance.

“If that was supposed to make me feel better, it didn’t.”

“Why?”

“You’re Concord, for waste’s sake! Billions of years of technology, billions of years of history—experience, wisdom, power. Tell me that *someone* on this ship has more of a clue than I do!”

Seeüwit and Tettinit were both laughing, and Neefaweet was conspicuously motionless, obviously trying to hold it in.

“What?” She was getting angry now. Surely they were teasing her.

“Emma,” Seeüwit said, “we’re not saying that no one knows what to do.”

“No,” Tettinit chimed in. “Not at all.”

“Then what?”

“What we’re saying is this: if you apply yourself, you have just as good a chance of solving this mystery as anyone else.”

“And better motivation,” Tettinit said.

“So, my dear,” Seeüwit said, rising effortlessly into biped mode. “Let’s see what you can do.”

* * *

They left after that, so clearly ze didn’t mean, “Let’s see what you can do today.” Before she left for home Nexus told her that the Mesozoic records were available and that it had assigned her a minor subsystem—roughly equivalent to the computing power of the entire city of Edinburgh, back home—for her to use in sifting through them. So the next morning, unclear what Seeüwit had really meant, she started in on a dinosaur history.

First she needed to know what she had to work with. She asked Nexus to connect her to her dedicated subsystem, which she named Max out of some wild impulse of irony; it was such a small part of Nexus that Nexus would never miss it.

“Okay, Max,” she said, “let’s start with the timespan you’ve got.”

It spoke with a voice that was subtly different from Nexus’s—even more masculine. “The accepted span of the Mesozoic is roughly two hundred forty-five million years ago to sixty-six million years ago, but the fossil record is imperfect and the precise dates are uncertain. So we retrieved everything from two-sixty to sixty.”

“Okay, two hundred million years. And how much data does the record contain?”

“The outer-system monitor buoy data has been compressed down to about twenty thousand hours at one frame per second. Each planet and moon, and the major asteroids and comets, have much more detailed records, averaging ninety thousand hours at the same rate. Since Earth was Presapient at that time, the buoys in orbit around it were more numerous than the dead worlds, so it has nine thousand forty-three times the average.”

If she never slept or did anything else, it would take a hundred thousand years to even glance at it all. She felt a little dizzy, so she went to get a drink of water.

She dropped back into her chair. “What kind of data are we talking about? Video, still photos, text?”

“No video except for Earth. Most of the outer system data was compressed into tables of data. Everything planetoid-size or larger has loads of tables, plus many still photos using the full electromagnetic spectrum. On Earth there is also about two thousand hours of video with sound, both full-spectrum, mostly in short sequences showing representative animals performing various biological functions such as eating, fighting, mating, migrating, and constructing habitats.”

Constructing habitats? She decided not to ask, she’d see it later.

“Okay, let’s prune this. I’m not interested in anything except Earth. Jettison everything else, plus the tables of data. Trim the still images, video, and audio to a Human’s sensory range.” She thought for a few minutes. “I want three things out of this. First, a detailed picture of the shifting landmasses throughout the study period, say one frame every century from both poles and two antipodal points on the equator, compiled as a sixty frame-per-second video with time stamps. What duration will that give?”

“Just over nine and a quarter hours,” Max said.

“Good. Second, I want a history of the evolution of feathers and of bird-like dinosaurs into birds. Pictures of the animals that had feathers or proto-feathers, close-ups of the feathers if possible, with attached video when available. Two or three images of each animal will suffice, and select the best video segment for each species and edit it to less than five minutes, removing duplication and boring stuff. Organize it as an interactive genealogical tree.”

“Very well.”

“Finally, I want the same kind of thing for the entire archosaur lineage, including the pterodactyls and the crocodilians. How long will all this take?”

It took Max almost a minute to answer. “About twenty days.”

“That long?” Then she thought about what would be involved in identifying all the species on Earth from trillions of photographs and thousands of video snippets, collating them and tracing their evolution into other species. It would take a city-full of Humans a century or more. “Please do them in the order I assigned.”

“Starting now. Do you want progress reports?”

“No, just let me know when each segment is ready.”

“Working.”

She leaned back in her chair. Moondog looked up briefly from her bed, then went back to sleep.

What had Seeüwit meant, “Let’s see what you can do?” Was she supposed to find the saboteurs with only the data they already had?

* * *

But she had a thought during her run the next morning, in a pause to look out over the lake. There was no breeze, so the mirror-perfect surface was disturbed only by an occasional fish pecking at something at the boundary between water and air. The bare branches of the deciduous trees were reflected starkly in the dark lake. The sun would be up in a few minutes; the sky was lightening and starting to get rosy.

She was thinking about the liquid/gaseous boundary that reflected solid objects. It suddenly occurred to her that she had not seen a spatial analysis of the various acts of sabotage.

After a shower and breakfast, she and Moondog went to work. She was a little earlier than usual, and the foot traffic was even lighter than normal. No Kchiks, only Aashaas and Thweetts. Moondog didn’t bother to bark at people passing any more, she just grinned at everyone as she walked at Emma’s heel.

After Emma got Moondog her morning treat and a fresh bowl of water, she sank into her desk chair.

“Nexus, I want to make a map of the sabotage events.”

“Please explain further,” it said.

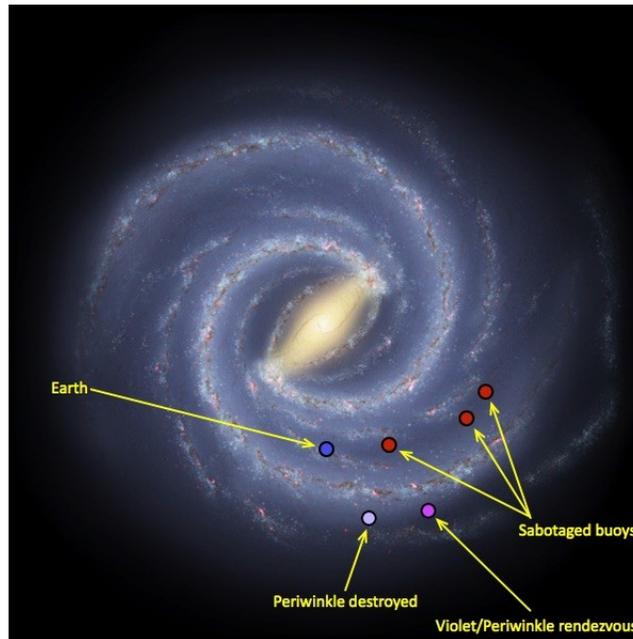
“Show me the galaxy, with a marker for Earth’s sun.”

A hologram of the galaxy as seen from above popped up above her desk, roughly the width of her outstretched arms. A blue point pulsed halfway in to the core just above the nine o'clock position.

"No, put the Sun at the bottom." The image rotated. "Put a marker where *Violet* and *Periwinkle* were docked."

A throbbing purple point appeared in the outer edge of the Perseus arm, farther out than Earth at about five o'clock.

"Now put markers in the three systems with sabotaged buoys."



Three red dots pulsed in the Sagittarius Arm, the next innermost from Perseus, ranging from around six o'clock to three.

"And the location where *Periwinkle* was destroyed, where we did the Light Retreat."

A light blue point throbbled in Perseus, between five and six.

"Give me a translucent overlay of the patrol zones of the Enforcer ships."

A colored overlay carved the galaxy up into eight parts: the Core, an inner ring cut into three segments, and an outer ring of four. Each was color-coded to the ship that worked in that area. *Violet's* was roughly from four to seven o'clock, stretching in from the outer rim to the outer edge of Sagittarius.

"Swap that out for a similar overlay of the Monitor ships."

This time the overlay was too complex to understand at a glance: there were over six hundred Monitor ships, patrolling much smaller areas that tended to overlap slightly, and unlike the Enforcer ships they had slices parallel to the galactic equator, so they were stacked above each other up to five deep.

"Remove the overlays."

The display went back to the six blinking dots on the bottom-right quarter of the galaxy.

She held out her hand and turned it, and the hologram rotated to match her movement. She caught a motion out of the corner of her eye and saw that Moondog was tracking the shifting image. The dog looked about ready to leap out of her bed and try to sink her teeth into this glowing mid-air toy.

"Stay, Moondog."

She moved her hand again to flip the image so she was looking at it from below, then edge-on. She pulled her hand toward her and the image zoomed in. She continued to rotate it until she had a clear idea of the spatial relationship between the six points. She couldn't see any correlation.

"Nexus, can you spot any pattern here?"

"Not spatially."

“Is there a pattern in the record of ships visiting the damaged buoy systems?”

“Over what time period?”

“Ah... The last three hundred years.”

“One moment.” She only had to wait a few seconds. “Nothing unusual. Those three systems were visited on schedule by the usual Monitor ships. The two that are closest together were visited by *Lime Monitor*, and the other by *Periwinkle*.”

“When was the last visit by *Periwinkle*?”

“Sixty-two years ago.”

“And the last visits to the other two?”

“Ninety-one and seventy-seven.”

“Those are pretty close together.”

“The coincidence is notable but not statistically significant.”

“Were there Humans on *Lime* when it last visited those two systems?”

“No, there never have been.”

She felt that there was something obvious she should be asking about those visits to the three sabotaged systems, but she couldn't put her finger on it.

“Let me have a list of all visits to all three of those systems since Contact, and a detailed itinerary for *Periwinkle* since it was launched in 450.”

“It's in your In basket.”

“Okay. Save the map there too. I might want to look at it later.”

“Done. Shall I close it down for now?”

“No. I want to study it some more.”

* * *

The next day, Max reported that the plate tectonics video was ready. Emma asked it to project it for her.

Four images of Earth appeared in the air above her desk, looking down from each pole and two looking at opposite hemispheres. But it was only barely recognizable as Earth. Most of the land was in one gigantic continent that reached from the south pole to about forty-five degrees north; the bulk of it was south of the equator, and the south polar areas were all land. There were lakes and rivers, but most of the interior of this vast landmass was tan desert.

It immediately became clear that, for dilettantes like her, sixty centuries per second was too slow to do anything but put her to sleep. The continents only moved a centimeter or two per year, so from space—at that rate anyway—the changes were glacial.

“Speed it up ten times,” she said.

The mass started moving visibly north until there was no land over the south pole. Meanwhile, a huge chunk—Asia—broke off the northeast corner, and what had originally been bays ate deeper and deeper into the remaining interior. Another big chunk split off the northwest corner; she thought she recognized it as the future North America. Then the remaining mass split in half on a southwest to northeast diagonal.

What was clearly Australia separated from the southern half, then changed its mind and reattached, while a triangle that she almost instantly recognized as India separated from the northern part of Antarctica and headed off at speed to the northeast. As if in reaction, Antarctica/Australia headed back south again.

While that was happening a small bay in the middle of the central landmass grew deeper and deeper until she could see what was soon to be the boundary between South America and Africa. As if repulsed by each other, they separated into distinct continents and South America began racing away, while Africa stayed pretty much where it had always been.

By this time North America had split into two parts, which continued moving northwest together. Nothing else dramatic happened until Australia apparently got tired of hanging out at the bottom of the

world and sheared off, heading northeast on its own; around the same time North America decided to be one continent again. The video stopped after about an hour with the continents in roughly the configuration she knew, except that the Americas were too close to the other continents and India was floating by itself in the middle of the Indian Ocean, near the equator.

“Save that and make it available on the network,” Emma said. “This is going to blow some geologists right out of the water.”

* * *

They spent eight days getting to the second Hermit system that *Violet*'s leaders thought they should investigate. Out of a sense of duty more than real interest, Emma spent some time studying the local Tribe, the <hiss>pit. They looked like seals that had changed their minds about living in the water: flippers had turned back into arms and legs, four of each, but they still had the sleek, streamlined bodies. No fur, however; these were not pseudo-mammals.

“Okay, what’s their story?” Emma asked Seeüwit as they waited to translate back. Kee 9 had joined them in their alcove in the Pilot’s Lounge, and was hunkered down on his rock, apparently asleep.

“The usual xenophobia. They sent out a scouting ship, quite small and very fast. It was a nice design, actually. We pulled up alongside them and said hello, and every single crew-member killed themselves. We took the ship back with the bodies in cold storage and tried to explain what had happened. The authorities listened calmly and then killed themselves, right in front of our Contact team. We left a ship broadcasting invitations to join for the usual time period, but no one ever responded. I’m just glad we didn’t trigger a mass suicide.”

“What the waste was that about?” Emma said, appalled.

“Pollution, according to their radio broadcasts. We had defiled them just by speaking to them. Everyone seems to have approved of what the ship’s crew and the authorities did.”

“Didn’t anyone anticipate their reaction? You must have been studying them intently as they got closer to leaving their system.”

“No,” Kee 9 said unexpectedly; apparently not asleep. “We didn’t see it coming. The Contact team was traumatized, and the inquiry afterwards cleared them of any wrongdoing. There’s no way anyone could have known. The <hiss>pit don’t have fiction or counterfactuals of any kind, and they’ve never competed against another species. They’ve never been a prey species, always the top predator since long before they became intelligent. So there was no clue how they’d react when they encountered something totally alien, not to mention superior. We could not have anticipated such a violent response.”

“Was it a religious thing?”

“No, they have no religion. They would consider that a counterfactual. It seems to be related to their dietary rituals.”

“That’s tragic.”

“I don’t say this about many Tribes,” Kee 9 said sadly, “but I dislike the <hiss>pit. I’m glad they declined.”

Emma tried not to imagine what it would feel like to know that the Pilots thought your Tribe was useless.

They flashed back into their own universe. Once again they were far out from the sun, and status messages flashed as the buoys started to report in. There were a fair number of manned ships moving between the planets, well over a thousand, and many more unmanned vessels. No message was delivered asking them to leave.

“No new messages,” her circlet said.

“Oh, no,” Kee 9 said.

“What?” she and Seeüwit said at the same time.

“A Renouncer group on Earth has claimed responsibility for *Periwinkle*.”

Interview #29 with Human Emma Fuji

29 April 520 AC (2633 AD)

7/5/307,597,923/39

- S: I have another potentially unpleasant topic to discuss.
- E: Uh oh.
- S: Tell me about the Renouncers.
- E: *[Laughs.]* Oh, Seeüwit, that's not unpleasant, just embarrassing.
- S: How so?
- E: It's like having a brother who believes that Concord is responsible for the Lincoln, Kennedy, and Schiller assassinations; or for the breakup of the United Kingdom. They're so ridiculous it's hard to talk about them without laughing.
- S: Their position is difficult to understand.
- E: Difficult? It's ludicrous.
- S: Can you explain?
- E: I'll try. I guess the first thing is that all the Renouncer states either have a history of religious fundamentalism, or a long, long history of trying to gain their independence.
- S: I don't understand either of those things. What does religious fundamentalism mean, and independence from whom?
- E: Ah. Well, fundamentalism is a literal reading of some ancient religious text. Anything not mentioned in the text—and I guess more importantly, anything not sanctioned in the text—is considered to be unreal, unclean, or the work of a demon. But fundamentalists never make sense. They're perfectly happy to use electricity—if they can get it—which is not mentioned in any ancient texts. So they pick and choose which parts of their texts to believe, which usually means the authoritarian, restrictive, exclusive parts. I think it's the reaction of people who can't deal with the world as it is, so they try to make a simpler, more structured world. I also think it's important that these worlds they're trying to build are never kinder, more joyous, or more free.
- S: That leads into the independence issue.
- E: Right. Ever since we invented agriculture, and people suddenly had something to lose, we've drawn boundaries: this is mine, that's yours. Sometimes people are included within a boundary that they had nothing to do with drawing. This happened to a lot of the tribes in Africa, where ancient enemies suddenly found themselves thrown into the same cauldron and expected to live peacefully together. And the Kurds—waste me, it took them millenniums to get their own state.
- S: Okay, so how does this relate specifically to the Renouncers?
- E: There are five Renouncer enclaves. Not one of them is a functioning state any more, though some of them used to be. Four of them fall into the fundamentalist category: Afghanistan, Yemen, Sudan, and Utah. Then there's the Basque Republic; after Contact they announced that after a thousand years of trying and finally succeeding in reestablishing their ancient state they'd be damned if they gave up any autonomy to anyone.
- S: What do the Renouncers believe?
- E: There's no single belief system. But all of them agree that Concord is either a hoax or a swindle, and they want nothing to do with it. When the United Earth Council was formed after Contact, those five areas refused to sign the Articles. So by unanimous vote of the rest of the signers, they were deprived of their sovereignty. No one trades with them, no one is allowed to travel to their territories, no services are provided to them. And they do not share in the technology or gifts from Concord, including remediation of the damage from the Waste. So all five are incredibly poor, their environments severely degraded, and their population shrinks every year; from five to ten percent a year, if I remember correctly.
- S: Why are they shrinking?

- E: Partly from deaths due to poverty. They can't trade with each other, since their so-called governments can't make treaties and no official vehicles are allowed to leave their territory. So they mostly have dysfunctional economies: they can't feed their people. Sickness and hunger only account for a small percentage of their losses every year, though. The biggest factor is emigration.
- S: Emigration to where?
- E: Out. Out of the Renouncer enclaves. All anyone has to do is walk across the border and say, "Please help me." They're given food, clothing, housing, education, employment, whatever they need.
- S: How many Renouncers are there?
- E: Around twelve million. Less than half a percent of Earth's population and shrinking all the time.
- S: Have you ever met one?
- E: No. UEC citizens are not allowed to enter the enclaves, and I've never run across an emigre. You hear about them, but very few make their way to Caledonia; it's not the most prosperous country, you know.
- S: Prosperity isn't everything.
- E: Don't I know it. Just try telling my mother that Caledonia is anything less than the grandest, most beautiful place on Earth. She'd break your legs and then set them for you.

Say what?

The sabotage team met again in the same small, domed, sandstone building on deck three near the Pilots' habitat. Emma took her place at the obsidian table.

"I wanted to gather once again," the Captain began, "to evaluate this claim from the Human Renouncers. Wheefent?"

"The text of the message is available at your stations," ze said.

Emma waved her hand at the small terminal embedded in the table before her, and words in a language she thought she recognized hovered in mid-air. She studied the flowing lines and curls for a moment before asking her cirlet for a translation.

The last free peoples of Earth, united, announce with righteous joy the destruction of the demon vessel known as Periwinkle, along with all of its demon crew and human slaves. This obscene, wicked craft prowled around the sacred heavens, defiling them with its foul emissions, spewing Satan's unclean words at the chaste stars, and spying on the holy work of free peoples; therefore in God's name we destroyed it. God willing, let all the other human slaves now open their eyes to their degradation and rise up to overthrow the sky demons and reclaim the Earth for purity in God's name. Death to all slaves of Satan!

Emma thought she would throw up.

Wheefent waited until everyone had had a chance to review the text in their own language.

"The script of the original is Arabic," ze said, "a common language before Contact which is still used by several of the Renouncer enclaves. The message was sent out in text form on a video carrier wave with no accompanying audio track. Five transmitters were used, one in each enclave. Shortly after this version was broadcast, the same message was transmitted in English and Euskara. The three versions were repeated twice, then the transmitters were destroyed, apparently by the people who sent the messages."

"Emma?" the Captain said.

She sat up straight in her chair and cleared her throat.

"Those three languages cover all the Renouncers. However, the text shows clear signs of being written by an Islamic author. Some of the phrases are common in Arabic but not in English; I have no experience with the Euskala language. Three of the enclaves speak Arabic and follow Islam. I'm

surprised that the Utah and Basque enclaves agreed to transmit this; most people in those enclaves practice some form of Christianity. But the message is not explicitly Islamic.”

“Do you lend it any credence at all?”

She hesitated. “I... I’m confused, to be honest. I didn’t think there was any way the enclaves could be communicating with each other. They’re widely separated geographically and they lost their telecommunications infrastructure—actually, almost all their infrastructure—in the Waste. Since they refused to sign the UEC Articles they’ve been quarantined. There’s no official channel for them to use to talk to each other.”

“Apparently,” Wheefent said, “they’ve found an unofficial channel.”

Zeep 4 angled one head up. “The enclave borders are not totally secure, is that correct?”

“Yes,” she said, “that’s right. The Renouncers have no aircraft whatsoever, and all roads crossing the borders are patrolled to keep official vehicles inside. But individuals wanting to leave are allowed to pass through; it’s just that no one can get back in. There are surveillance systems to ensure that.”

“You *want* people to leave,” Zeep 4 said.

“Exactly.”

“If I may,” Feesh 23 said. “It would not be hard to coordinate this. It would only require some time. One volunteer walks out of whichever enclave began the process, then gets close enough to the others to simply throw a message across the border at an unobserved point. You could wrap paper around a rock to do it. The border guards and surveillance systems only register Humans crossing the line. Throw enough rocks and you could synchronize it.”

“Fine,” the Captain said. “That’s how the broadcast was done. But what about their claim to have caused the sabotage? Emma?”

“It seems impossible to me. Even if they got some kind of... I don’t know, undercover agent onto the *Periwinkle*, there’s no chance that the Renouncers could have developed the technology to do the damage. They can’t even keep their power plants running full-time.”

“I agree,” Feesh 23 said. “We still believe that all the sabotage must have been done by the same group, correct?” There were murmurs, grumbles, and twittering from the other attendees. “The destruction of the monitor buoys in four systems required a concerted effort—”

“I’m sorry,” Emma said. “*Four* systems? We only visited three.”

There was a long silence.

“We were going to tell you,” Zeep 4 said. “The message came in shortly after we translated back, and there just hasn’t been time. Another system has been blinded, just like the others.”

“Okay. Where?”

Ze lifted zis head higher. “Rhea,” ze said.

* * *

Emma had always found the benevolence of Concord unfathomable. Yes, they would not save a planet from natural disasters, and yes, they had eradicated nearly four hundred Tribes that could not restrain their Killer instincts. But the Hermits were not only left alone, they were protected from predation; and once a planet joined Concord, the new Members were given access to billions of years of technology—at no cost. Not everything; not the more dangerous science, no weapons and not the secret of navigating the bubble universes. But more than enough to solve permanently the fledglings’ power and nutrition needs, to provide safe and efficient transportation and communication, to remediate a damaged ecosystem, to prevent disease, to reengineer their own bodies and minds if they decided to do that.

And a ship of their own—the lost *Periwinkle*.

And a new planet.

On the day that the United Earth Council ratified the Articles—when over ninety-five percent of humanity had by direct vote agreed to renounce war, murder, and torture; to act as one Tribe; to live within the bounds of their native Solar System until they were granted permission to expand; to repair

their half-dead planet; to extend suffrage to every person old enough to understand the issues—on that day Concord had announced that a second Earth was being prepared for them. The terraforming would take two thousand years, but Humans would have to wait another eight thousand to claim it. When their probation ended, they would be given—*given!*—a second Solar System and a second planet capable of supporting Earth life.

In Greek mythology, the first being to exist was Chaos. One of his daughters was Gaia, the Earth, and one of her daughters was Rhea. Rhea's children were the Olympian gods Zeus, Hera, Demeter, Poseidon, and Hades.

So—ignoring the moon of Saturn that was already using that name, not to mention the screams of outraged astronomers—the UEC had christened Earth's daughter Rhea. Since Contact a large proportion of humanity had spent their lives working to ensure that when probation ended they would be ready to accept responsibility for their second Earth.

* * *

Someone had taken out most of the monitors in Rhea's system. Why? Was something going on there that the saboteurs didn't want anyone to see?

There was a lot more discussion, but Emma had a hard time following it. She felt dizzy, disconnected. She managed to get control of herself and focus on the discussion again in time to hear the conclusions.

Since they were already here, they would spend one day in the <hiss>pit's system, looking for evidence of escape as they had with the Yiyi.

Then they would travel at top speed to Earth. The Renouncer's claims were impossible to believe, but they must be investigated.

And finally they would travel to Rhea and discover what had been done there.

It was perhaps coincidence that people seemed to be avoiding her eyes. With aliens it was sometimes hard to tell, especially Thweetts, who had three of them. But no one stopped to commiserate or reassure her. No one touched her arm or patted her back and said it would be all right. The others filed out of the conference building and into the steady, remorseless light of deck three without more than the minimum of courtesies.

Then there was a touch on her arm. Seeüwit.

"Let me take you home," ze said.

She nodded and they walked outside into the bright, clean street. She barely registered anything along the way, she was not aware of the forty-five minutes it took to travel back to her habitat. Neither of them spoke until the giant door opened and she looked out at the soft late-afternoon light falling on the rounded boulders of the transport station entrance near her cottage.

"Make some dinner," Seeüwit suggested. "Go for a walk with Moondog. Go for a swim. I'll see you tomorrow."

She nodded silently and started the walk home.

* * *

When she arrived the next morning, Max informed her that the bird ancestry tree was ready. She snarled at it to go waste itself.

Loyal

10 June 521 AC (2634 AD)
7/5/307,597,926/65

Homeward bound

When they'd been underway toward Earth for almost a week, Emma made a conscious effort to shake off the depression and hopelessness that had plagued her since they'd received the Renouncers' claim. She'd spent nearly the entire time alone in her habitat with Moondog, playing fetch, running, tagging, eating comfort food, and staring at the walls. After trying in vain to work on the first day after the second sabotage meeting, she'd realized she was worse than useless and had gone home and not returned.

She twitched Seeüwit that she would be in the office that morning, went for a longer than normal run, and after breakfast called to Moondog, "Let's go to work." Sometime after her first day at the office, the dog had learned what that phrase meant and bounded up eagerly whenever she heard it.

Seeüwit was waiting for them when they arrived.

"I'm happy to see you again," ze said. "How are you?"

"Better. I was... You know."

"Yes, I do. You need to believe that the evidence for Human involvement in these disasters is no stronger than before. No one except a few simpletons thinks you're sabotaging yourselves."

"Which simpletons?"

Ze hesitated. "They're not worth talking about."

She took care of getting Moondog settled and sat down in her desk chair.

"Well, thanks for giving me the time to come to grips with it."

"You're welcome. What are you going to do next?"

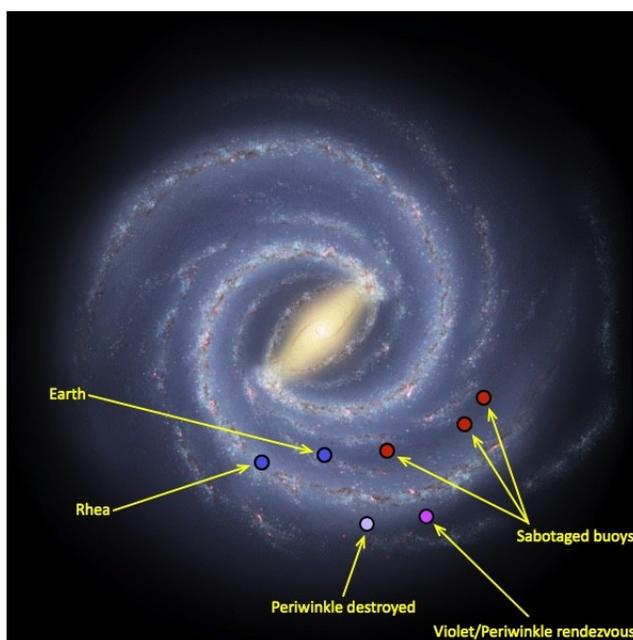
"I was working on something before we got to the <hiss>pit system. I was hoping you would take a look at it."

"Of course."

"Nexus, bring up my incident map." The galaxy appeared in the air over her desk. "Add Rhea." A second blue dot appeared below and to the left of Earth.

Seeüwit came over and studied the projection. After a moment ze asked for labels and gestured to rotate the image so ze could study it from below and from the side. Ze zoomed in until they were just looking at the lower third of the galaxy.

"Interesting," ze said. "No one had thought to do this before. Nexus, add the relevant dates to each point."



The dates of sabotage appeared below each pulsing point. Rhea was marked with only a question mark, since no one had yet determined just when the damage had been done.

“Add the dates of the last visit by a Concord ship,” Emma said.

Concord and Earth dates also annotated each point. Rhea had last been visited by *Gold Monitor* about fifty-one years ago.

“From above the damaged systems are almost in a straight line,” Emma said.

“But I’m sure you’ve noticed that the illusion vanishes when you look at them from the side,” Seeüwit said, gesturing again to rotate the image so they were looking face-on to the disk. From this perspective the positions of the throbbing dots didn’t line up at all.

“I just thought it might be significant.”

“Nexus?” Seeüwit said.

“There’s no statistically significant spatial correlation, other than that all the systems are in the same quadrant of the disk.”

“I have this nagging feeling that I’m missing something obvious,” Emma said.

“I don’t see what. Nexus?”

“If there is something there, Emma,” it said, “it’s *not* obvious.”

“Okay. Save the changes.” She stared at the map for a moment longer and then asked Nexus to close the display. “Hey, Seeüwit, I’ve got a genealogical tree for feathers and birds on Earth. Want to see it?”

Interview #8 with Human Emma Fuji

10 September 519 AC (2632 AD)

7/5/307,597,921/68

S: Do you realize how unusual it is for Tribes to wear clothing?

E: Unique?

S: *[Laughs.]* I think I’ve told you before, there are no unique characteristics—only unique combinations. There have been intelligent Tribes in the galaxy, and before that in the dwarf galaxies that merged to become our galaxy, for almost thirteen billion years. It’s very difficult to come up with something that hasn’t been tried before in that span of time.

E: How far back do your records go?

S: Who’s conducting this interview?

E: At the moment, I am. Well?

S: During the early days of Concord we preserved as much ancient knowledge as we could find. The oldest records, while fragmentary, go back to before the galaxy existed in its current form. Over twelve billion years.

E: But the universe is only about fourteen billion years old!

S: Yes.

E: Okay, you knocked my leggings off. *[She waves her hand.]* I yield the floor.

S: Leggings?

E: *[Plucks at the cloth tightly covering her legs.]* These.

S: But they're still— Oh. An idiom. Tell me about what you're wearing.

E: Let's go top to bottom. This *[points to her circlet]* is my twitcher—

S: Quantum entanglement communicator.

E: If you say so. This *[fingers the loose cloth enveloping her upper body]* we call a tunic. Garments like this were worn going way back to ancient times, although often they didn't have sleeves like mine. Then the leggings, which probably look very constrictive to you but are surprisingly comfortable. And *[lifts one leg, shod in knee-high boots]* everyday boots. Do you want to hear about the undergarments?

S: There's more underneath?

E: Thin layers.

S: Why?

E: Ah... Well, to protect the outer clothes from body oils and, ah... for support.

S: Support?

E: *[Pauses, then grabs the protrusions on her upper chest and lifts them.]* I'm a female mammal. These things tend to sag with age if you let gravity have its way.

S: This is all rather strange to us. You see, most organisms evolve to adapt to their environment, so they have integument that protects them from the elements and they don't... sag with age. Moondog doesn't have to wear clothes.

E: Moondog, like you, has built-in clothes.

S: So what happened to *your* built-in clothes?

E: They're in the wash.

S: What?

E: That was a joke. Look, we evolved for one environment, but then we spread out to cover the planet so fast that we didn't have time to evolve to fit the new environments we found. To succeed we had to change our micro-environment, so we invented clothing.

S: So what was your original environment?

E: Savanna. Grassy subtropical plains, with scattered trees. Our near ancestors were tree-dwellers. Several of the ape species became ground-dwellers, but some were still arboreal. Humans can climb trees, but not as well as our ape relatives did—before they went extinct.

S: Then you spread out to other environments?

E: *Every* environment. Pre-Contact Humans lived on every continent including Antarctica. In the far north, where it's always cold; high on mountains and plateaus where the air *should* be too thin for us to breathe; in deserts without enough water; in tropical lowland river deltas where the air is so moist our ability to sweat is useless; and in temperate forests that have hot summers and cold winters.

S: As I understand it, another function of clothing is to cover the reproductive organs.

E: Yeah, not to mention the secondary sex characteristics. *[She lifts her breasts again.]*

S: Unlike every other Concord Tribe right now, you have external genitals...

E: *[Smirks but doesn't respond.]*

- S: Okay, you don't want to talk about that; we'll deal with sexuality some other time. Let's move on. Your styles of clothing used to change regularly, but they don't anymore. Why is that?
- E: Clothing fashion used to be a very big thing, from what I've read. The styles would change from one year to the next, and people who followed the styles religiously would replace a lot of their wardrobe every few years, if not more often. They used to laugh at other people who wore obsolete fashions, and treat them badly. A measurable part of the world economy was taken up by this nonsense.
- S: But this was something that persisted for centuries, right?
- E: Oh yes, ever since there was wealth. The court of Louis XIV in France, five centuries before Contact, was obsessed with fashion. Supposedly he invented the whole idea of seasonal fashions as a way of distracting his courtiers.
- S: Then what changed it?
- E: The Waste. After we started recovering, with your help, we decided collectively that fashion was a symptom, and also a cause, of the Waste. It went out of fashion, so to speak. There are about seven common styles of dress now, varying by culture and climate, and people replace their clothing when it wears out, not because some idiot in a far-away country decides that sleeves should be shorter, or that the colors we've been wearing are ridiculous.
- S: How can a color be ridiculous?
- E: Exactly. It's ridiculous.

Homecoming queen

Shortly before *Violet* was scheduled to translate to Earth, Max finished the dinosaur evolutionary tree. Emma spent some time exploring the branches, watching a video here and there. The stegosaurus surprised her by being more nimble than she had expected. Lots more dinosaurs had feathers than anyone had ever been able to prove, and many of them were hard to tell from ground birds like ostriches—except they had a tendency to leanness while she'd always thought of ostriches as feathered beach balls with long legs and snaky heads. Not that she'd ever seen a live ostrich; and neither had anyone else since the Waste. But overall she had lost her enthusiasm for the project well before it was finished.

"Nexus," she said when she felt she'd wasted enough time on dinosaurs.

"Yes, Emma."

"I'm done with Max. Could you make up five memory cards, each with a copy of the three presentations?"

"Certainly. Do you want them here or at home?"

"Here is fine. I'm curious about one thing, though. How did Concord get those videos and stills of the dinosaurs? They were obviously not shot from orbit."

"The closer a tribe gets to intelligence," it said, "the farther away the monitors stay. In Presapient systems it's common for drones to go down to the planet surface to take samples and record the evolution of life on that world. Before that there's really no point, because one Prokaryotic system is a lot like another except for details of chemistry. Once intelligence arises, the drones back off so they're high enough not to be seen. After machine technology is achieved, they recede to orbit. And, as you've seen, once the Tribe develops space flight, the drones are recycled and the buoys withdraw to the comet cloud."

"Okay. Don't delete the files from the network, I'll probably want to look at them again."

"Nothing like that is ever deleted. Anyway, a few thousand people have already seen them, so interest is obviously high enough to leave them in ready access."

In the time it had taken her to browse idly through the dinosaur tree, thousands of the other inhabitants of *Violet* had already seen it. And probably understood it better than she had. Well, maybe not the Pip-vesh.

She had a few hours left in the day. She pulled up her incident map again and continued trying to work out a timeline that made sense.

* * *

Their alcove in the Pilot's Lounge was nearly full. Almost everyone she knew on the ship was there, along with many she didn't know at all. Perhaps they wanted to see her reaction to coming home—or was there something more sinister going on, such as “the next time she sees this she'll never leave again?” She refused to believe that—the sentiment or the possibility.

A large crowd of Pilots clustered around their sitting rocks. There were too many of them for the modest number of seats, so some of them were perched precariously on top of each others' fantastic back-spines, forming a pyramid that would be right out of nightmare if she didn't know how friendly they really were.

There had to be fifty Thweetts, ten Aashaas, and two or three Uks (you'd think they would be easier to keep track of considering their size). There were also dozens of Mustjippits taking turns allowing Moondog to stand on their backs. Watching them, she realized that if they lined up along the front of the alcove every Pilot could have a seat; they weren't much different in appearance from the rocks the Pilots were using. She decided not to mention the idea.

There were no Pip-vesh, but that was no surprise; they weren't very sociable. What did surprise her was that there were three Kchiks, including Fichtek, clustered together over at the far left side of the opening. They stayed as far away from Moondog as they could, but every now and then the dog looked at them and growled.

It was still fifteen minutes till translation. Emma left the group of Thweetts she'd been talking to—mostly Seeüwit's family members—and walked over to the Kchiks. They saw her coming and their body language changed.

“Hello,” she said.

“Greetings, Emma,” Fichtek said. The others faced her but didn't speak. Something was nagging at her about the way they were standing.

“I haven't seen you since that day in Peeblejum.”

“No. One has been very busy. As you may know, there are not many of us here on *Violet*, and much work to do.” She happened to know there were over a hundred thousand Kchiks on board; what did “not many” mean to them?

“So you're getting plenty of exercise.”

“Fortunately, one likes to run. As do you, one understands.”

“Yes, I go for a long run at least every other day.”

“But perhaps you get to run where you want to go, instead of where you must go.”

“That is true.”

She saw a movement out of the corner of her eye and turned. Moondog was sneaking up on them as if she were going to attack—like a cat sneaking up on a squirrel. And suddenly she understood the way the Kchiks were standing, but the thought was so shocking that she didn't have time to process it before Moondog started barking at them. The three Kchiks turned and she saw the same thing directed at Moondog. It was straight out of the nature documentaries she had watched compulsively as a child, lamenting the long-lost wilderness of her world.

The Kchiks were barely restraining themselves from attacking, like a hungry lion who wants to leap at an antelope but knows that the time is not quite right.

She picked up Moondog and shushed her.

“I'm very sorry, her manners need some improvement.”

“Yes,” Fichtek said.

“I'll take her back to the Mustjippits. It was nice talking to you.”

“And to you,” he said, but for the first time she realized that this was a lie.

* * *

The screen flashed red, then white, then cleared to show the back side of Earth's moon. They were in a high lunar orbit, and in a few minutes they came around the limb and Earth appeared below them.

Emma couldn't help but think of the plate tectonics movie that she'd had Max compile from Concord records. There were many times in Earth's history when the seas had been this high, but not in Human history before the Waste.

Ireland was no longer a single island, but two. Caledonia wasn't much changed, other than also being split in two by a very narrow channel. But Britain was half the size it had been when the Romans tried to conquer it. Northern Europe was mostly underwater. Africa looked pretty much as it always had, except for big scoops out of the far western and northern edges. The landlocked seas in Eastern Europe had rejoined the world ocean. A third of India and China and most of southeast Asia were underwater. Australia was nearly cut in half by a shallow inland sea.

In the western hemisphere, Hudson Bay was fifty percent bigger, and much of northern Canada was part of the Arctic Ocean. The peninsula of Florida was completely gone. The Mississippi delta was hundreds of kilometers north from its old position, at the tip of a long, narrow bay. North and South America were no longer joined; there were three other waterways joining the Atlantic and Pacific Oceans that would have made the Panama Canal unnecessary. Only a few islands remained in the Caribbean. The entire Amazon basin was now a bay of the Atlantic, and much of Argentina was underwater.

Antarctica was bare dirt, high mountain ranges, enormous lakes, and thousands of islands.

There was no ice at either pole, no glaciers covering the tallest mountains. In the Atlantic Ocean a string of hurricanes were queued up waiting for their shot at the American coasts.

This was the world that Emma had grown up in, and though she could see in her mind the continents as they had been before the warming began, she had never seen it with her eyes, and never would. It would take tens of thousands of years to undo what Humans had accomplished in three hundred, and it was doubtful that they would try to go all the way back. By the time remediation could have completely reversed the warming, ecosystems would be starting to stabilize again, and continuing back to the past would only do more harm.

People were starting to move in her direction, presumably to congratulate her on something or other.

"It's a beautiful world," Seeüwit said at her side.

"Yes," Emma said sadly.

* * *

Most people had cleared out after a brief comment about Earth or that they were glad she had the chance to visit home again. Of course everyone knew she hadn't returned since her arrival on *Violet*; Earth was in *Violet's* patrol area but so were hundreds of millions of other stars. For most people who lived and worked on *Violet*, the ship was home; they had never lived on any planet. Seeüwit's clan had lived for hundreds of millennia on *Periwinkle* before they moved here. She was very likely the only planet-born person on the whole ship.

"Emma," the Captain twitched her. "Would you gather Seeüwit and Feesh 23 and meet me in Control 1 when you're free?"

Control 1? "Yes, of course," she replied. "We're done here."

A few of the Pilots and Thweetts were still hanging around, talking to each other and getting snacks from the bar. Pilot snacks looked like beef jerky, but spring green, so they were probably plant-based. The Thweetts were popping small, multi-colored, round things that were clearly fruits into their mouths whole.

"Seeüwit," she said. "The Captain wants us and Feesh 23 to go to Control 1."

"Really? Have you ever been there before?"

"I don't have the slightest idea where it is."

"It's not far from here, actually." Ze trilled something that her circlet translated as a hail and Feesh 23 turned from perusing the menu at the bar. Seeüwit twittered at zim, repeating the Captain's request.

“It’s about the landing party,” Feesh 23 said as ze came up to them.

“Of course,” Seeüwit said. “This will be Emma’s first time in a control station.”

“Ah. Let’s not make her wait, then.”

“Or the Captain either. You know Aashaas hate waiting.”

“Do they?” Emma said. She had never heard that before.

They both laughed, one by fluttering tsheef and the other by rumbling nearly inaudibly.

“Most Concord ships are captained by Aashaas,” Feesh 23 said. “That means they have to be the most patient people in the galaxy. Other than Pilots.”

“That doesn’t mean he *enjoys* being kept waiting,” Seeüwit said. “Let’s go.”

They walked to the nearest transport station, which was less than a minute away. Emma sat down on the encircling bench, but the other two stood.

She wanted to tell Seeüwit about her realization concerning the Kchiks, that they acted polite but really hated her. When she tried out the conversation in her mind, though, every approach seemed either childish or paranoid. She had no proof, only a subtle reading of body language and the way Moondog always barked at them. This seemed rather feeble even to herself.

And what did it signify, anyway? She knew from her studies of the past that many of Concord’s Tribes, while cooperating fully and accomplishing magnificent things, had openly disliked each other. The Pip-vesh rarely talked to anyone but Pilots, for example. She wasn’t aware of any other enmities between the Tribes she had met, but she knew that there was a pair of extant methane-breathing Tribes that, while sharing the exact same environmental requirements, could not be put on the same ship together or eventually one of them (it varied which one) would get angry at the other and eat some of them in a momentary lapse of manners.

As long as the Kchiks were polite, what difference did it make? She hardly ever saw them anymore, anyway, since they had moved all their operations to Peeblejum.

But if they disliked her so much, why had Fichtek scrambled to check that she was okay after she’d been stranded outside? Why had he and his two rude friends come to watch them arrive at Earth today?

The transport doors opened and she realized they had arrived already, after only two minutes.

“That’s the shortest ride I’ve ever taken,” she said.

“It would be walking distance from the lounge except that there’s no direct route,” Seeüwit said.

They walked out of the transport and Emma immediately had to step back in shock. She leaned against the doorframe and craned her head back. They were standing at the base of a wall of black aphrosine that rose straight up to the next deck, thirty-three kilometers above. The wall extended out of view to either side. It seemed to be flat, but it might have been subtly curved; it was too massive to be sure.

“Waste me,” Emma muttered. Why had she never seen this immense column before?

“It may be a bit excessive,” Seeüwit said, ruffling zis tsheef in amusement.

“No, it’s not,” Feesh 23 said. “It’s strictly functional.”

“What function?” Emma whispered.

“Control. This is Control 1, the most heavily armored part of the ship outside the core. If all the rest of *Violet* were somehow blown away, we could still house all of the ship’s population here indefinitely, while maneuvering to deliver a decisive counterattack.”

“It’s a safe room,” she said. “A keep.”

They paused for a moment to translate the concepts. “Yes,” Feesh 23. “Exactly.”

Ze led them to the immense, featureless wall and rumbled something in zis own language. Her circlet didn’t translate it. What had been a solid wall developed an opening as a huge square plug receded. It reminded Emma of the way the outer airlocks pulled back and slid away when you were leaving the ship.

They walked into the ten-meter wide tunnel, its floor, ceiling, and sides made of smooth, featureless aphrosine. Usually surfaces made of the composite had some texture, as if they’d been finished with a

palette knife. These were as smooth as glass and utterly black, like obsidian. There was no noticeable source of light, but she was able to see well enough to walk safely. She looked up and saw that small glowing panels were set regularly in the ceiling. It was a strange effect, because the corridor looked unlit even though she could see where she was going.

The tunnel was longer, and therefore the walls of Control 1 were thicker, than the airlock doors on the external hull of *Violet*. She knew that the airlocks were backed up by a system of interlocking bars so that they wouldn't be weak points for attack. Each of the ship's shells was the same thickness as the spaces between, roughly 33 kilometers. She could now see the end of the tunnel, and they'd only been walking for a few minutes, so the walls of the control station had to be thinner than the deck floors; if they were stronger than the hull, as Feesh 23 had implied, there had to be something invisible reinforcing them.

When they reached the end, there was no sign of the plug that had withdrawn to let them in. They came out into a huge space, at least hundreds of meters wide and deep, but no taller than the tunnel they'd just come through. The space was broken up into work areas, each of which had numerous giant display screens and seating or sitting places for at least a hundred people. Each of these areas had consoles and other control interfaces, but no one seemed to be using them. The people she could see—numerous Aashaas, Pilots, Thweetts, Mustjippits, and Uks but no Pip-vesh or Kchiks—were either studying displays or talking, to other people around them or to Nexus terminals.

If *Violet Enforcer* had a bridge like a sailing ship, she supposed this was it.

An Uk lumbered up to them like an oversized grizzly bear and growled at them to follow him. Ze led them around and past several of the stations to a sunken area that seemed to be in the center of the enormous room. The Captain was perched on a thick stand there, talking with a small group of Pilots, including one that Emma recognized from her news station as Reevap 2, the principal Pilot of the ship.

"Ah, Emma, Seeüwit, Feesh 23," the Captain said. "Please rest for a moment while I finish up here."

The Uk waddled away and the Captain turned back to the Pilots. Emma's circlet declined to translate what they were discussing. But he finished a few minutes later and twisted on his perch so he was facing them.

"We were just setting up the official delegation," he said. "Diakon is fussy about protocols."

"I've never been there," Emma said.

"I'm afraid you won't be going on this trip, either. We're sending down two groups. One is the delegation to the UEC, but you three will be part of a mission to investigate this Renouncer claim. And, ah, Emma, if you have personal business to attend to, we will certainly make as much time for that as you need."

"Thank you. I would like to visit my family."

"Of course. Other than you three, how many do you think should go with you?"

"I think we should take Wheefent," Emma said. Ze had been one of the principal investigators.

"I was going to suggest the same thing," Feesh 23 said.

"And perhaps Zeep 4." Also one of the leads.

"Yes," Feesh 23 agreed.

"And that's it. The people we may be talking to have almost certainly never seen non-Human Tribes before. We want to appear official but not overwhelming."

"I might suggest," the Captain said, "adding another Human to your party. To make it appear that you are an equal partner, not outnumbered."

"Ah," she said. "I hadn't thought of that."

"I'll have someone contact the UEC and get a recommendation. You'll rendezvous with the other Human after landing on Earth, and then head to your primary contact area. You should be ready to go by next shift." About seven hours from now, three in the morning by her time.

"Where are we going?" Emma said.

"The enclave called Yemen."

Interview #40 with Human Emma Fuji

4 September 520 AC (2633 AD)

7/5/307,597,924/39

- S: I can understand how Humans still had nations before Contact, but it's puzzling that the idea hasn't faded away since then.
- E: Didn't your Tribe have factions and small-t tribes before Contact?
- S: Of course.
- E: And how long did it take *them* to fade away?
- S: I have no idea.
- E: I'll bet it was more than five centuries. Thweetts have been civilized for over two billion years; I'm not sure we've hit ten thousand yet.
- S: I concede the point, although I'd like to mention that another young species, Kchiks, were civilized for a hundred thousand years before Contact and never had a war in their recorded history.
- E: Well, I guess they're quick learners. Or they're sweeter than we are.
- S: Well... maybe. Tell us about nations on Earth.
- E: Have you ever seen what happens to droplets of mercury on a flat, jiggling surface?
- S: You mean the coalescing and splitting of small blobs?
- E: Yes. That's us. We have a word, mercurial, that means unpredictable or volatile. Let me give you an example from my home, Caledonia, which is the northern half of what was once a single island. It was merely a coalition of tribes for a long time, then it was a handful of small kingdoms, which finally united about two thousand years ago. Probably by force, I'd guess. Scotland, as Caledonia was called then, was at war with the nation inhabiting the southern half of the island, called England, for a long time. But due to some weird twist that I can't remember, when England's queen died without children, the king of Scotland also became the king of England. Despite having one ruler for the two countries, they stayed separate nations for a hundred years before being united into a new nation called Great Britain. I'm not sure whether 'great' in this context meant 'larger' or 'better,' but anyway. A hundred years after *that* they merged with another country, Ireland—well, half of it anyway—and became the United Kingdom. Two hundred years later, about a hundred years before the Waste, Scotland started making noises that maybe they'd be better off as a separate nation again. Then central governments fell apart along with everything else during the Waste. After Contact, nations started reconstituting, and since half of England was underwater, and the two halves of Ireland were now separated by a channel, Scotland decided to be independent again and renamed itself Caledonia.
- S: Waste me!
- E: And that's a ridiculously condensed history of just one small island on Earth. If I told you the story of Ireland your head would explode.
- S: Okay, I can see that it's complicated. But what sustains it?
- E: Ah. Let me think. *[Long pause.]* Well, Humans are very, very susceptible to imprinting when they're young. If you tell a little boy that a giant man with a white beard lives in the clouds and will smite him with a lightning bolt if he pulls his sister's pigtails or steals his brother's cookie, then he is probably going to grow up believing this nonsense without questioning, and then teach it to *his* children.
- S: That makes sense, I suppose. We've already discussed religion.
- E: Nationalism is just another kind of religion. You grow up being told that your tiny corner of an insignificant planet is the most wonderful place in the history of everything, and furthermore that the gods love you and hate your enemies; and you're going to believe it and perpetuate it.

Because pondering things like this is not helpful to making a living, raising your children, and fitting into society. People don't want to question what they were taught as children.

S: They don't notice that other places on their planet are also very nice, and the people there love their home just as much?

E: Most people don't travel much; that's been true for the whole history of humanity. And anyway, you can always argue that the people you don't like aren't really Human, so their opinions are worthless.

S: What?

E: It's the oldest trick in the warlord playbook. One of the most effective ways to foment war is to convince your people that the enemy isn't Human; they just look a little like Humans. Do you know the idea of the uncanny valley?

S: No, I don't know that one.

E: For Humans, things that are obviously not Human don't usually invoke an emotional response. We don't feel revulsion at trees, for example, or cows or tractors, although we do find puppies and bunnies adorably cute, and spiders are creepy. On the other hand, show someone a picture of another person's face—any person—and their brain will start working, trying to figure out if they know this person, male or female, friend or foe, like-me or not like-me. Judgments, and almost always an emotional response. And those decisions are typically made within a fraction of a second of seeing the image.

S: So...

E: Now, construct an image that is close to Human, but not quite right. Almost everyone will feel a deep sense of wrongness and revulsion. In the gap between not-at-all Human and completely-Human is the uncanny valley, where almost-Human provokes disgust.

S: That's very strange.

E: All you have to do to get some people to treat other people as objects to be shoved aside is convince their brains that these other people occupy the uncanny valley. And sometimes that valley is just across the river, in the neighboring nation.

S: I think you have a lot of growing up to do.

E: Tell me about it.

Sand and bullets

Emma arranged for Neefaweet to stop by once a day to make sure Moondog was okay. The house was able to feed and water her, and she could get in and out through her dog door, but Emma had never been away from her dog for even a day since they'd met, and she didn't know how Moondog would react. Since Moondog and Neefaweet had spent a fair amount of time playing together, it seemed like a good solution, and Neefaweet said ze was happy to do it.

She met her fellow travelers in Shuttle Bay 91, the same one they'd used to visit the AI embassy. It was the middle of her night, but she'd got four hours of sleep and that should be enough. Teeker 17, the shuttle pilot, greeted her happily and told her that she was the last to arrive. She climbed aboard the big purple egg-shaped shuttle and stowed her bag in a cabinet in the back of the cabin.

"You made it," Seeüwit said.

"Don't start. I had to say goodbye to Moondog." She buckled herself into the Human seat.

"Did you get everything settled with Neefaweet?"

"Yes. Ze said ze would stop by at least once a day. I think that probably means three times. Or ze might just move in. I decided not to pry."

Seeüwit ruffled zis tsheef and hunkered down in triped mode.

"Hello, Emma," Wheefent said, followed by rumbling greetings from the other two Pilots. She said hello back to everyone.

"Where are we meeting our contact?"

“In a city called Sana‘a,” Feesh 23 said, “in a country also called Yemen, which I find very confusing.”

“Sorry to interrupt,” Teeker 17 said. “We’re ready to go. Would you like to see out on the way down?”

“Yes, please,” Emma said.

The hatch through which she had just entered vanished as the door closed and the aphrosine sealed itself. One of the beauties of the composite, other than its impossible toughness and its ability to be tinted with any color desired—she wondered idly whether Concord named its ships after colors because of that property, or if that had been engineered in so they could color the ships—was that it could heal itself at the molecular level. The hatch was not closed; the hatch no longer existed.

They lifted off the bay deck gently and started through the airlock procedure.

“Let me try to explain about Yemen,” Emma said. “When we started recovering from the Waste after Contact, nations did not automatically reform along the old lines. Some countries decided to merge or split up, others had lost most of their coastlines, some were completely gone—underwater. So the nations of today bear only a slight resemblance to what they were before the Waste. All the areas that had wanted independence before—the Kurds, for example, or the African countries that had been formed with no regard to ancient tribal boundaries—became separate countries under the Articles. When the Renouncers refused to sign the Articles, the enclaves were set up in their ancient homelands, but not with the old boundaries. All the enclaves are much smaller than the original Renouncer nations. Utah, for instance, encompasses what had once been just a single city in a single province of an entire nation. Most people in Yemen ratified the Articles, so only a small section of the old country of Yemen was set aside for the enclave. And the Renouncers consider themselves to be the true Yemen, even though they only occupy about ten percent of the old land area.”

“So,” Feesh 23 said, “you have a nation called Yemen that—I presume—surrounds the enclave of Yemen.”

“That’s right.”

“This is a Human thing,” Seeüwit said, as if that explained everything.

“Yes, and as I’ve said before, it’s temporary. The Yemen enclave population is only a few million, and shrinking every year.”

As they left the airlock the upper half of the shuttle went transparent. The Moon loomed above them like the craggy, beaming face of an old friend. Emma wondered if the official delegation had departed *Violet* yet, but then she gave her whole attention to the rapidly approaching planet. The Moon-to-Earth distance that the early NASA astronauts had taken three days to cross in their cramped, corrugated steel cans took their shuttle only half an hour. The blue-and-white globe took on more detail, showing tan and green patches. When they reached the outer edges of the atmosphere, the Indian Ocean was directly below them.

Concord did not believe in deorbiting retro burns or heat shields, like the Human pre-Contact, pre-Waste space programs. When you had essentially unlimited energy and sufficiently advanced shielding, you didn’t have to rely on gravity to pull you down to a planet’s surface: this was a powered descent, not a fall.

The bubble of force that surrounded them parted the thickening air without friction, and somehow (Emma had never understood this) overcame the compression issue, so there were no flames and no ablation, but she imagined that there was a really impressive sonic boom. They moved west toward Africa. She was dimly aware of Teeker 17 murmuring to someone in the Pilots’ deep, booming language, but she kept her eyes on the planet. The tip of the Arabian peninsula appeared around the edge of the expanding globe and they flew north to meet it.

Several kilometers above the surface they slowed to subsonic speeds. It felt like drifting on the wind compared to their previous speed. They continued moving north and west, toward the nearly-square

southwest corner of the peninsula. It took another few minutes to reach the upper part of the western highlands, then they were dropping straight down toward the tan-and-blue clutter of a city. It became clear that they were heading for the airport outside of the city proper. Emma got a glimpse of surrounding mountains, a gigantic mosque surrounded by lesser stone structures interspersed with a few dark green trees, before they settled onto the circled H of a helicopter landing site.

The shuttle became opaque again, and a display lit up to show a small electric vehicle leaving a hangar and heading across the field toward them.

“That’s our contact,” Teeker 17 said.

In a moment the runabout drew up to the shuttle and the driver got out. He was tall, dressed in traditional, belted Arab robes with a white keffiyeh on his head. The man reached into the back of the vehicle and extracted a small duffel bag, then turned to the shuttle.

The hatch reappeared and a ramp extruded. Emma stood up. The man strode up the ramp and entered the shuttle. His face was lean, tanned and weathered, with a sharp nose, a short beard just beginning to go gray, and clear green eyes.

“Emma Fuji,” he said in a confident baritone as he entered the shuttle. “By Allah, it is a great honor to meet you.” He bowed deeply and she returned it. “And who are your distinguished colleagues?”

Emma managed to introduce everyone despite feeling short of breath. It had been three months since she’d seen another Human being.

“I am Zikri Saqqaf, Concord attaché for the Arabian countries. It is wonderful to meet you all, though I am most sorry for the cause of our acquaintance.”

“Are you prepared to lead us to the enclave now?” Feesh 23 said.

“I am ready. Ah... I see there is only one Human chair here.”

“My apologies,” Teeker 17 said. “One moment.” Ze did something at a control panel and a hole appeared in the floor beside Emma’s seat; a second identical chair rose up beside it. The opening vanished and the new seat now appeared to be integral with the deck just like the original one. “If you will take your seats, it’s only a few minutes’ flight to the enclave.”

The shuttle hatch vanished again and everyone settled themselves.

“I assume you’ve been told why we’re here,” Emma said.

“Naturally. I am ready to assist in any way I can. If I may... the first assistance I should offer is this.” He reached into his bag and extracted a striped blue cloth.

”Headscarf?” she said.

“Yes, what some refer to as hijab. It is not strictly necessary, but the enclave is populated by fundamentalists and it may help smooth the way. If I may...” He showed her how to wrap the cloth so that it covered her hair and shoulders.

“Is the rest of my clothing okay?”

“Quite acceptable. The tunic is modestly loose and nearly reaches your boots, so the tights are not a problem.”

Emma realized that the others were watching this exchange with intense interest. Seeüwit’s tsheef were ruffling in amusement.

“Cut it out,” she said to zim.

“Could you explain this, please?” Wheefent said.

Zikri gave them a brief explanation of the traditional views on modesty in Islam, along with some quotes from the Qur’an supporting them.

“And is this still common practice?”

“The hijab, like my ghutrah, or keffiyeh,” he touched his wrapped headdress, “are traditional, and many Islamic people wear them solely for that reason. The religious motives to wear them are fading. The niqab and burka, which are women’s scarves that cover much more of the body than this one, are no longer worn outside the enclaves. Now for myself, I wear the ghutrah because it’s comfortable and practical: it keeps the sand out of my hair and the sun off my head.”

“Why did you ask Emma to wear this hijab?” Zeep 4 said.

“The people we are going to visit are very strict, very old-fashioned, and just a little bit crazy. Well, maybe more than a little bit; they can be violent to outsiders. My thought was that if Emma appeared to be following their customs it might be easier for us to find out what we want to know.”

“Do you mean,” Seeüwit said, “that wrapping a cloth around Emma’s head will outweigh the appearance beside her of four aliens?” Ze gestured at the rest of them.

Zikri laughed. “Well, I see your point. But think of it as a gesture of conciliation. It may help. It can’t hurt.”

“Landing in two minutes,” Teeker 17 said.

Feesh 23 said something back to zim, and ze replied briefly. Emma didn’t catch the exchange because she was watching Zikri stare at her.

“What?” she said.

“You’re much prettier than your pictures,” he said.

She felt herself blushing. “Thank you, but let’s just stick to business. We need to eliminate these people as suspects so we can find the real perpetrators.”

“Of course,” he said, bowing slightly. “What happened was a tragedy and a great loss for all of humanity. I can’t pretend not to enjoy your company, but I promise not to let that interfere with our work.”

She waited a moment before saying, “You looked up my pictures?”

* * *

Teeker 17 had left the shuttle opaqued during the short trip. On the display they could see the western highlands giving way to a low desert plain, then they reached another range that was the start of the central highlands. In a high valley they came to a village surrounded on all sides by sharp, barren, dry peaks. They settled in the center of a town square, beside a well. The squat buildings surrounding the square were made of crumbling sandstone. There were no plants, and no visible inhabitants.

“Activate the warder,” Feesh 23 said.

An opening appeared in the back wall of the cabin and a matte black sphere about a meter in diameter floated out. It was featureless and somehow very forbidding.

“What is that?” Emma said.

“Protection,” Feesh 23 replied.

“Very good idea,” Zikri said. “May I suggest that the warder exit first, then myself, followed by Emma and then the rest of you?”

“You think that’s better than just plunging in?” Seeüwit said.

“Yes, I do.”

“Okay, then. This ought to be interesting.”

“Open the hatch,” Feesh 23 said.

Emma moved closer to the display so she could watch what happened. She had never been within sight of a Renouncer enclave before, let alone inside one. She didn’t think anyone alive had ever entered one from the outside. Thousands of people *left* each enclave every year, but no one ever went in.

The warder floated past them and out the hatch, taking up station just beside it, three meters off the ground. Zikri took a deep breath and followed it out, descending the ramp to the dusty ground. Absolutely nothing happened; no one appeared to greet or molest him.

Emma took her turn and walked down the ramp. The air was thin and cool; it smelled like resin and dust. She felt like she might sneeze, and fought it down. When she reached the packed-dirt surface she went left, as Zikri had gone right. She stood motionless beside the ramp with her back to the purple shuttle and her hands at her sides, waiting.

A mild breeze made a slight soughing noise as it blew between the buildings. There was no other sound, and no movement.

Out of the corner of her eye she saw Feesh 23 appear in the hatch, and all hell broke loose. Dozens of automatic weapons opened fire, and she crouched down with her hands over her head. But she didn't hear any bullets flying past her—and more to the point, nothing hit her. She looked up and saw hundreds of small flashes of light, like daytime fireflies blinking all around. Barely visible streaks of ruby light flashed out from the warder and touched openings in buildings here and there, and as it did the number of weapons she could hear steadily diminished. Within a minute the square was silent again, except for a thin whistling of wind.

Feesh 23 and then Zeep 4 walked down the ramp and stood off to one side. Emma saw Seeüwit step into the opening and then something very fast flew at him from the top of one of the buildings, leaving a smoky trail. Whatever it was, it vanished in another firefly flash, somewhat bigger than the bullets had left, and another beam of light lanced out at the source of the projectile, winking out just as she became aware of it.

Seeüwit started down the ramp and Wheefent appeared in the doorway. Half a dozen dark, fist-sized objects came sailing at them from various directions; every one vanished silently in a burst of light, each followed by the ruby beam.

When all six of them were standing on the ground, the ramp retracted and the hatch disappeared. The wind whistled its lonely tune.

“By the grace of Allah,” Zikri called out, in Arabic “we have come to speak to you and not to fight. We wish you no harm, we bear no ill will. We bring gifts and desire only to talk to your village elders.”

“Begone, slave of Satan,” someone unseen yelled in the same language.

“I am not a slave,” Zikri said. “I am Zikri Saqqaf, son of Rayyan Saqqaf of Al Jawf, and these are not demons, nor minions of Satan. They are people from other stars, who wish merely to visit peacefully and hear your voices.”

“Hear my voice,” another invisible person said. “Roll your stinking carcass back into that filthy egg of Satan and fall back into the sky from which you came.”

“This I will not do,” he said. “We are come in peace, and we will not be frightened away by men too timid to show themselves, but who hide behind walls like silly women afraid of thunder.”

A burly man in dirty robes, with a sun-darkened face anchored by an enormous black beard, stood up atop a one-story building to their right. He leaped down from the roof, landing more lightly than Emma would have believed possible for such a large man, and strode up to stand a few meters in front of Zikri. On his shoulder was an antique automatic rifle that looked as if it had been lovingly tended.

“I am not timid, slave,” he said. His was the second voice. “My name is Ahmad Naaji, and you were not invited and are not welcome. And neither are these beasts of Satan.” He dropped the rifle into his left hand and pulled the trigger.

Emma flinched, but the spray of bullets, which would surely have killed all of them except possibly the armored Pilots, evaporated in little firefly flashes a meter from the muzzle of the gun. When he'd emptied the clip, the warder's red beam reached out and melted the barrel, then touched Ahmad's cheek and left a complicated brand tattooed there. It looked vaguely like a kanji glyph, but Emma could read kanji and several Chinese scripts, and this was not one she'd seen before.

The man stared at his now-useless weapon and dropped it in the dust. He reached up with one huge paw of a hand and touched the brand on his cheek, wincing. His fists bunched and he looked ready to launch himself at Zikri.

“Enough,” a third person called out. This was a much older voice, a little quavery.

Ahmad stepped back, then turned and walked unsteadily toward the building he had jumped from. A much smaller, thinner man walked out of the crumbling building straight ahead of them, limping a little. He wore belted robes and a white keffiyeh, both clean but tattered. As he got closer Emma could see that his face was nothing but wrinkles, his thick beard was pure white, but his eyes were clear and stern.

“I am Yasin Tawfiq,” he said, “elder of this town. Since we cannot kill you or drive you away, perhaps we can talk you to death.”

* * *

“Why *this* little town?” Emma whispered to Zikri as they followed Yasin back toward his house.

“The transmitter was raised in those hills right over there.” He pointed to the south. “The Gulf of Aden is only a few kilometers past them.”

A dusty threadbare cloth was the only door to the ramshackle house. Emma followed Zikri inside, suppressing another sneeze.

“May we come in?” Seeüwit asked in Napien from outside. Zikri translated.

“Come in demons, I don’t care. You’re too alien to be unclean.”

The house was small, apparently divided into just two rooms, one of which, at the back, was curtained off. Emma assumed the women of the house, if any, were behind that curtain, listening. The front room was sparsely furnished with two chairs, a table, and a small chest, all made of battered wood that looked like carved driftwood. The seven of them and the warder nearly filled the space.

Yasin stood in a far corner of the room; he seemed to be vacillating between the Arab tradition of hospitality and his disgust at their very presence. In the end it may have been poverty that decided the issue: he didn’t look prosperous enough to spare a single fig. He relaxed against the wall behind him and didn’t offer food or drink or invite them to sit.

“Tell me what you want so you can leave all the sooner,” he said, looking straight at Zikri. He seemed determined not to see Emma or the aliens.

“First allow me to thank you—”

“Skip the pleasantries, Saud,” Yasin interrupted. “I’d as soon have killed you as looked at you, but since I can’t do that, let’s not prolong this.”

Zikri bowed slightly. “I will get right to business, then.” He reached into his duffel bag and pulled out two parcels wrapped in brown paper, each about as big as his two fists, and set them on the table. Yasin looked at them expressionlessly and said nothing. Then Zikri pulled out a roll of gold coins held together with clear shrink-wrap. Yasin’s eyes widened. Next came a box that was clearly a first aid kit, marked with the red crescent. He had Yasin’s full attention now. Lastly he extracted and set on the table a black box somewhat larger than the wrapped parcels. He set his duffel down on the floor.

“Chickpea flour,” he said, pointing to one of the parcels. “Dried dates,” the other. “This is a water purification system,” the black box. “It’s very easy to use; the instructions are inside the lid. It will purify water from your well or desalinate seawater.” He ignored the gold and the first aid kit.

Yasin said nothing for a moment, just looked at the treasures on his table. It was possible that he was now the richest man in the enclave.

“What do you want?”

“We want to ask you about the transmission that was made from here three weeks ago, and the transmitter that broadcast it.”

Yasin smiled cruelly. “Hit a nerve?”

Zikri said nothing. He set one hand lightly on the table with the gifts, only fingertips touching. Yasin considered.

“I will get the men who dealt with the outsiders, and erected and then destroyed the tower, and instruct them to tell you everything they know.” *Outsiders?* Emma thought. Yasin paused. “For another roll of gold.”

Zikri stared at him for a very long time before retrieving his bag and pulling out another roll of coins. He set it on the table with the other.

“If we are not satisfied,” Zikri said, “I will take back all these gifts. I will find them even if you hide them in your darkest hole. Then I will poison your well and pound your house into the sand.”

Yasin smiled, a real smile this time.

“I like your style, Saud,” he said. “You have a true gift for bargaining. Follow me.”

He led them all outside, walking quickly despite his limp.

“Why does he call you Saud?” Seeüwit asked quietly.

“I was born in Al Jawf in Saudi Arabia,” Zikri said. “Even if I hadn’t announced that, he would have known from the way I talk and dress. The family of Saud founded our country. He thinks he’s insulting me, but the Saud family has been extinct since the Waste, and I have no emotional baggage he can sink his claws into.”

“How did he know you had another roll of coins?” Emma said.

“Probably the weight of the bag. I’m surprised he didn’t bargain for the third one too.”

They followed Yasin down a sloping dirt road that led off the square, then down a narrow alley between houses. He stopped at a larger building, one story of crumbling sandstone like all the other structures in town, and called out a greeting. A very thin man stumbled out into the street. He was dressed in dirty robes and keffiyeh, with bags under his eyes and skin like oiled mahogany.

“Omar,” he said, “get your brother and Ahmad and Ayaan and go to the square. Talk to these demons and demon spawn. The man will give you each one gold coin for answering his questions.” So much for the third roll of coins, Emma thought. “Tell him the truth, tell him everything he wants to know. Then we can be rid of them.”

The thin man nodded and ran back into the house.

“Meet them in the square,” Yasin said. “I am done with you.” He walked briskly back the way they’d come, still limping but obviously eager to get back to his booty.

* * *

They went back to the center of town and gathered at the opposite side of the well from the shuttle. The warder hovered at head height behind them. The aliens had barely spoken since they’d arrived.

“Do I have your permission to continue negotiating?” Zikri said.

“Yes,” Feesh 23 said. “Your knowledge of these people is most helpful. Since only Seeüwit knows Napien, none of the rest of us knows Arabic, and these people do not have quantum entanglement communicators, we would need you to translate for us in any case.”

He looked at Emma. “Quantum en... What?”

“Twitchers.”

“Ah.”

“You have done remarkably well so far,” Seeüwit said. “We trust you to continue doing what needs to be done.”

“Thank you,” Zikri said. “I have to say that the four of you looming silently in the background is probably unnerving them, which helps.”

Feesh 23 looked up at him from one waist-high head. “Looming?”

“Well, you know what I mean.”

“I suppose everyone in the village is watching us right now,” Wheefent said.

“Of course. Nothing so exciting has happened in this place for two thousand years. This conversation is probably also helping; seeing us speak to each other will make them nervous, wondering what we’re talking about.”

“Shall we strut around and try to look scary?” Seeüwit said, ruffling his tsheef in amusement.

“I think that you strutting around might remind them of chickens, which would not be scary.”

“I never strut around,” Feesh 23 said. Zeep 4 concurred.

“Seeüwit,” Emma said, “please restrain yourself.”

Ze bowed and ruffled in a complex pattern that seemed to be a blend of laughter and self-deprecation.

They heard a goat bleating. “I have seen no dogs,” Wheefent said. The others agreed.

Zikri said, “There is dispute in Islamic tradition about the keeping of dogs. These fundamentalists would likely give more weight to the teachings that dogs should not be kept in the house, and that their saliva is unclean. In any case, they probably couldn’t afford to feed them, and they wouldn’t need them for herding or hunting; there are no large animals in these hills anymore.”

“That’s a shame,” Seeüwit said. “We like dogs.” Zikri frowned at Emma, but decided not to pursue it. “Do you have a dog?”

“Yes,” Zikri said. “An Afghan. That’s a type of hound.”

“Much larger than Moondog,” Emma said.

“Moondog?”

“They’re coming,” Zeep 4 observed.

Four men shuffled into the square as if on their way to execution. One of them was Omar, the thin man Yasin had charged with gathering the rest. Another was Ahmad, the large man who had shot at them from close range. One was very old, obviously older than Yasin, and frail; he was helped along by a man who looked a lot like Omar but younger, perhaps in his mid-thirties, and not so emaciated. They walked over to the Concord group. The younger men squatted on their heels, the ancient was let down slowly onto the ground by his helper.

Zikri squatted across from them. Emma sat down beside him and folded her legs under. The Pilots lowered themselves until their crab legs were invisible.

The Thweetts sank down in triped mode, which clearly startled the Renouncers. Emma sympathized: the Thweett ability to walk on either two, three, or four legs took some getting used to. In triped mode their traveling arm, the one growing from what in a Human would be the middle of the back, swung down to the ground, reducing their height and therefore lowering their center of gravity; it was their most common resting stance. In this mode their “arms” and long neck rose straight up from one end of their body instead of from what a Human would think of as their shoulders. Since they had universal joints and all five limbs were identical, including the hands/feet, they could walk in any of the three modes, but typically walked on two, rested on three, and ran on four.

Zikri pulled the last roll of coins from his bag and tossed the bag aside. He set the coins, still wrapped, on the ground before him. The men across from him stared at the gold, then gave Emma a good looking-over before turning their attention back to Zikri. None of them would meet the gaze of the aliens, not that it was really possible to do that with a Thweett.

They sat quietly for a long while. Zikri finally broke the silence.

“Zikri Saqqaf.” He gestured at Emma. “Emma Fuji.” Then at each of the others in turn. “Feesh 23. Zeep 4. Seeüwit. Wheefent.”

The Renouncers waited just long enough to be insolent but not long enough to provoke an outburst.

“Omar,” the thin man said. “My brother Youssef,” gesturing at the younger man. “Ahmad,” their attempted murderer. “Ayaan,” the old man. “What do you want? When can we have our gold?”

“We want nothing but information. You get the gold once we have it.”

“Ask your questions then, slave,” Ahmad said.

“You will stop speaking to me in this disrespectful way,” Zikri said calmly, “or I will leave and take all the gold with me, including what I gave to Yasin. And then our djinn here,” gesturing at the warder floating behind him, “will grind your house to dust.”

The old man, Ayaan, spoke for the first time, in a voice that was hardly more than a croak. “Ahmad, be still. You tried violence, and it made you look weak. Your meaningless rudeness makes you look foolish. This is a business transaction. Whether you like these people and their demons or not, you are either here to conclude the business or you’re a cowering simpleton afraid to stand up to Yasin. Which is it?”

Ahmad swallowed his temper and took a deep breath. “Ask your questions.”

Zikri bowed from the waist. “Who built the tower that sent out the broadcast?”

“My brothers and I,” Ayaan said, “when we were young.”

“Why did you build it?”

“We were paid to build it, just as *you* are paying us to *tell* you that we built it.”

It took a long time to extract the story. Over fifty years ago, a stranger had walked into the village. He was Yemeni, but no one had ever seen him before. After talking with the elder, Yasin’s

predecessor's predecessor, he had selected Ayaan and his two brothers to do a job for him. He brought schematics and told them where they could find the materials. It had taken the brothers almost a week to drag these parts—mostly metal struts and connectors—from a hidden cache in the hills to the east up to the site the stranger had shown them. It took two more weeks to construct the tower and install certain mysterious black boxes connected by wires. When it was done they signaled the stranger with a device he had given them. After he inspected the work, he took the device back, paid them, and donated three goats to the village. He said that someone, probably not himself, would return in a year or ten or a hundred with another task.

That prophecy had come true a month ago. Another stranger, also a Yemeni, had arrived in the village on foot with several more mysterious devices. This time he selected Omar, Youssef, and Ahmad to do the work. One device was to be connected with wires to the other black boxes installed by Ayaan so many years before. The others, they were led to understand, were explosives that would destroy the whole thing when its job was done. He left instructions for how to connect the devices and when and how to activate them. This time he waited in town for the work to be completed, and as before, he paid the workers and donated some goats to the village's herd.

At the designated time, Ahmad had triggered the black box, then started the timer for the explosives. This was their entire involvement with the affair.

Zikri broke open the wrapper on the coins and, leaning forward, carefully set one coin on the ground in front of each of the men. None of them moved. He sat back, looked at them one by one, then leaned forward and set another coin atop each of the first. That left him with four gold coins.

"We must go to this place where the tower was," he said. "Whoever guides us will get the rest of the coins."

Ayaan reached out and picked up his two coins. "I am too old to climb these hills anymore," he said, "and even if I could, I am done with you."

Ahmad snatched his coins too. "I am done with you as well," he said. "I want no more of your money." He helped Ayaan to his feet and they walked away.

Omar looked at his brother. "We will take you," he said.

* * *

They asked the brothers to wait a moment and walked back to the shuttle, which opened for them. Zikri stayed outside. Emma asked the shuttle's fabricator for some hiking boots, a small backpack, and trail food, and filled two small insulated canteens with water. The Thweetts retrieved bandoliers with pockets full of small devices from the bags they'd brought onboard, and slung them across their bodies. The Pilots pulled fist-sized devices from the same storage cabinet and secreted them on their bodies, under their shells. Emma wanted to ask where exactly they were putting them, but controlled herself.

Omar and Youssef led them out of the village on an uphill road that, if it ever rained, would be one impassable mud hole after another. As it was, the dust was choking, and Emma wished she had thought to bring a mask; she thought about pulling her hijab down to cover her mouth and nose. But a quarter kilometer out of town the road dwindled to a path on bare rock, and though it was very hot the going got easier.

There was so little vegetation along the way that she wondered if there was something wrong. She asked Zikri about it.

"This area gets very little rain, and the goats are relentless," he said. "The Renouncers have been locked into this enclave for half a millennium, and they've essentially eaten everything that ever grew here."

"I'm surprised there's not more starvation, then."

"There's more than you think. The population is not just dwindling from emigration."

The brothers seemed to be listening while pretending not to, but since she and Zikri were speaking Napian, and all Renouncers abjured the language, it seemed unlikely that they understood what was being said.

The warder floated behind and above them, silently observing, following Zeep 4, who was bringing up the rear in the single file train on the narrow trail. Emma tried not to think of it as ominous, and she knew it would never let anything harm her, but it was somehow scary; as if it were intelligent, malevolent, and only accidentally on her side.

The path began climbing more steeply, and soon they were well above the little valley that held the village. The low mountains they could see on all sides of them were gray and brown, with no signs of vegetation. Emma had no trouble breathing despite the altitude and the exertion. The phylax cells in her bloodstream—which made it possible for her to breathe the air on *Violet*, even though it wasn't quite the right mix for Humans—worked just as well when the problem was oxygen shortage due to altitude. Some of the engineered cells clustered in her lungs, improving their efficiency, and others roamed in her blood, helping red blood cells deliver oxygen. She felt no more tired than she would have climbing a hill at sea level—which was not tired at all, thanks to her running regimen— but Zikri was starting to look a little winded.

About an hour and a half into their hike, they came to a bare rock ledge that jutted out from the mountainside. It had a clear view in three directions; she could see the Gulf of Aden off to the south, and mountains everywhere around them. The ledge was strewn with twisted braces, splinters of dark metal, and shards of rock. The wall of the mountain, on the west side, showed dark streaks emanating from a spot about two meters off the ground.

“This is the site,” Omar said. “We have fulfilled the task as promised.”

Zikri handed him the remaining four coins. Omar transferred two of them to his brother, then they turned to go.

“I have some food and water,” Emma said. “Ask them if they would like to share it.”

Zikri relayed the message. The brothers paused without turning, then continued back down the trail without speaking.

“How about you?” she asked Zikri.

“I'd be honored. Gentles, do you require any assistance?”

“No, thank you,” Feesh 23 said. “Please, both of you, relax and have lunch.”

Since they'd gotten up in the middle of the night, it was actually about breakfast time by Emma's body clock, but she was willing to call it lunch. Anyway, it was getting close to midday local time.

Before Emma could sit down, Zeep 4 scuttled off the edge of the cliff. She walked to the brink and looked over. Ze was walking down the nearly-vertical face with no difficulty whatsoever, carefully placing each of his eight feet and using both pairs of arms to poke through bits of stuff that the explosion had thrown over the side. She shook her head and drew back from the edge, going to sit near Zikri beside a large rock.

Emma unwrapped her hijab and stuffed it in an outer compartment of her backpack. She gave Zikri a canteen and pulled packages of food out of the pack. There was hummus and flatbread, olives, three kinds of pickles, small oranges, and bars of chocolate mixed with crushed nuts.

“A feast,” Zikri pronounced.

“Would you mind,” Wheefent said, “if I had a small piece of your chocolate?”

“Not at all,” Emma said, and held up the box. Ze broke off a square and bowed.

“Ze likes chocolate?” Zikri asked with a puzzled expression on his face.

“Ze tried one of my brownies at the picnic—”

“Picnic?” he said, laughing.

So while they watched the aliens taking samples and testing them with the equipment they'd brought, she told him the story of her visit to the Thweett habitat and their picnic, including Neefaweet racing Moondog. Then she had to explain Moondog and her current status as canine celebrity.

Seeüwit was talking to the warder, having it use a laser to carve off small pieces of the fragments ze picked up. Ze fed some of them into one of his gadgets, and handed others to Feesh 23 and Wheefent to do the same with theirs.

They'd been there over an hour, and Emma had packed up the remains of their lunch and laid back with her head on the backpack, feeling drowsy, when a clatter of stones announced Zeep 4 returning. Ze popped over the edge, crawled onto level ground, and began pulling dozens of small pieces of machinery and metal out from under zis shell and piling them on the ground. The other three inserted them one at a time into their devices.

Finally they were done.

"Emma," Zeep 4 said, "would you mind if we put these samples into your bag? I don't think they weigh much more than a kilogram."

"I don't mind carrying them. You four have been doing all the work."

"You won't need to carry them," Feesh 23 said.

Less than a minute later she saw why. The shuttle rose up silently to hover just off the mountainside, and extruded its ramp to the rock ledge. She had imagined walking back the way they'd come and enduring the hostile, unseen observation of the villagers again, but of course there was no point to that. They all boarded the shuttle and the hatch sealed. The warder floated back into its cupboard, which closed up behind it.

"Zikri," Seeüwit said, "where would you like us to take you?"

"Well, where are you going?"

The non-Humans seemed to converse silently for a moment.

"I think the results of our examinations are clear," Feesh 23 said. "The tower was made entirely on Earth, and so were the explosives that destroyed it. But the signaling devices are the same as the other sabotage material we've examined: same exotic composition, same technology. I still believe it is impossible that Humans are the source of this technology. We will never find the strangers who delivered these things to the village, so we can't trace this stuff back to whoever *did* make it. I don't think there's any point in examining the other four broadcast locations. Do you concur?" The other three did.

"Therefore our examinations on Earth are complete." Zikri looked stricken. "However, we promised Emma she could take as much time as she needs here. So where do you want to go, Emma?"

She looked at them all and steadied her breathing.

"Lago Viedma, in Argentina," she said. "Then Aberlour, Caledonia."

Teeker 17, who was watching all this from the pilot's stone in the front, said, "At your command, Emma."

"Zikri?" she said.

"If you wouldn't mind..." he faltered.

"Would you like to accompany me?"

"Yes, I would."

"You want to visit my dead lover's family, and then mine?"

"Yes." Firmly.

"Teeker 17," she said. "First stop, Argentina."

"I think I will need some different clothing," Zikri said.

Interview #46 with Human Emma Fuji

14 November 520 AC (2633 AD)

7/5/307,597,924/118

S: You are the only child in your family.

E: Yes. It's very common for couples to have just one child. Humanity has been through one exponentiation, thank you very much.

S: I imagine the dynamics of a family are quite different when there are multiple children.

E: I never knew a family with more than two children.

- S: But in the past—before the Waste—large families were common.
- E: Sure. Especially on farms. It takes a large family to run a large farm or ranch. The larger the family, the larger the farm you can run, and the more prosperous you are.
- S: But that wasn't the only reason.
- E: Ah. No. Our biology makes it difficult to plan pregnancies. Really effective birth control was only invented a century or so before the Waste, and it was practiced unevenly. Many poor people couldn't afford it, some cultures actively discouraged it, some people had religious objections.
- S: Really? Why?
- E: Do you really want me to digress into abnormal psychology? Denial of observed fact, blind submission to authority, lust for control, logical fallacies? All that?
- S: Well, perhaps another time.
- E: The easiest way to bring down the birth rate was to educate and empower women. But a lot of entrenched dogmas, power structures, and bureaucracies were threatened when that happened. It happened anyway, but not enough, and not in time.
- S: Let's get back to families. In your part of the world they usually consist of one person of each sex, who may or may not have children. Is that typical?
- E: It's varied over time, place, and culture, but in much of the world that has been the most common pattern. In most cultures the richest or most powerful males tended to have more females, either all at once or serially. But typical people—if I can use that word regarding the relationships between the sexes—get married and have a child. And in the past, they would have another, and another, and another.
- S: Do adults and their parents maintain ongoing relationships?
- E: Unless they have a falling-out, yes. Raising a child is difficult; it's always been difficult. Humans go through a stage where they need to break away from their parents and become independent, and some parents aren't ready to let go. It can create tensions. And, to be honest, Contact didn't change the Human race; it just removed some of the major excuses for us to be jerks. But some people will be jerks despite that. Anyway... if you're lucky, the child and the parents become friends again after the child has found her own way.
- S: Tell us about your relationship with your family.
- E: My mother is brilliant, headstrong... difficult. I love her, and I know she loves me, and there's real warmth in our relationship. But sometimes she makes me want to scream.
- S: What about your father?
- E: Very different. He's quiet, strong, thoughtful. Not demonstrative. But in many ways I think we were bound more tightly than Mother and I were. But never with words.
- S: Do you have other relatives?
- E: My father has a sister in Japan. I understand she has a child a little older than me; we've never met. My mother was an only child. She has a cousin in Africa somewhere, but I've never met him. That's it. It's really just Mother and Father and me.

Motive and means

Zikri came out of the Human restroom wearing loose pants tucked into everyday boots and a blousy shirt. It was nearly impossible to recognize him as the same man. His hair, now exposed, was medium-length, black with gray at the temples, and curly. He saw Emma looking at him and turned a full circle.

“What do you think?”

“I'm not sure it suits you.”

He laughed.

The shuttle was hovering several kilometers above the rock ledge they had just taken off from. The dry mountains rolled away below them like the folds of a rumpled bed sheet. On second thought, Emma had asked Teeker 17 not to head west just yet.

“I’d like to consider the next steps before we get moving,” she said, “and also to discuss what we’ve just learned.”

“Good idea,” Zeep 4 said.

The Thweetts relaxed in triped mode. Zeep 4 and Feesh 23 turned on their rocks so one head was facing her and Zikri, who had returned to his seat beside her.

“Can Teeker 17 join us, too?” she said.

“Of course,” Feesh 23 said.

“Delighted,” Teeker 17 announced, and touched a panel to extrude another sitting rock. Ze left the pilot’s station and climbed up onto it.

“There’s no point rushing to Argentina,” she began. “It’s now...” She consulted her circlet. “... around six in the morning there. Most people won’t be up yet, and even if they were it’s too early for a social call. We shouldn’t plan on showing up before ten.”

“Okay,” Teeker 17 said. “I can stay suborbital. At Mach 3 we should get there in about four hours.”

“Good. Now, Feesh 23, you said you didn’t believe the materials came from Earth or were made by Humans, and that there’s no way to track down who brought them.”

“Yes.”

“Let’s take the second point first. Someone had to move a lot of mass across the enclave border. How did they do that?”

They thought about that for a second.

“All the enclaves are no-fly zones,” she said. “No trucks can cross the border; all roads are monitored and have guard stations. Anyone can leave, but no one is supposed to go in.”

“I see your point,” Feesh 23 said. “The material had to come across far away from the guard posts.”

“Or...” She hesitated. “Or the guards let it through.”

“That seems unlikely,” Zikri said. “The guards are very well vetted, and none of them are local. They don’t stay at one station very long, so there’s no chance for them to be compromised.”

“Well, either way, the whole border is under surveillance. Feesh 23, you said at our last meeting that someone could throw a message over the border. I believe that’s possible; the surveillance systems probably wouldn’t flag that. But someone carrying aluminum beams and struts across should have triggered an alarm.”

“You’re right. Ayaan said the materials were delivered about fifty years ago. Would records have been kept for that long?”

“It’s worse than that,” Zikri said. “They could have spent years delivering the material piece by piece, maybe only one every year, and only contacted the village when it was all in place.”

“Yes,” Emma said, “and they might have waited years after the stockpiling was complete before actually talking to anyone. And how did these two strangers cross the border without the sensors triggering an automatic response?”

“What are you getting at?” Wheefent said.

“First,” Emma said, “whoever did this devised a plan with complicated logistics that spanned decades, maybe centuries. Individuals and dissident groups aren’t capable of that kind of long-term patience.”

“Like the sabotaged buoys,” Zeep 4 said. “The bombs that destroyed the buoys were placed in those systems decades before they were actually triggered.”

“Yes. So I believe that not only were the devices not created by Humans, neither was the plan. Unless...” She hesitated.

“What?” Zikri said.

“Governments *are* capable of that kind of planning. And maybe of secretly developing technology that would not be recognized as Human. Also, I don’t see how the material could have been smuggled across the border without someone in the government turning a blind eye. Maybe placing guards who would go along with the scheme.”

“Government?” Zikri said in astonishment. “You mean the Council—the *United Earth* government?”

She nodded unhappily.

“It doesn’t make any sense. Why would they sabotage the future of the Human race? They’re supposed to be *securing* it!”

“Well,” Seeüwit said sadly, “we have seen this sort of thing before. Factions that think membership in Concord is a bad idea. Like your Renouncers, but actually inside the government.”

Zikri jumped out of his seat and strode to the back of the shuttle. No one said anything. He faced the back wall, where the warder had vanished into its storage area, and muttered to himself in what sounded like Arabic, but the words were indistinct. He seemed to be restraining himself from punching the wall. Finally he stomped back and took his seat.

“I apologize,” he said. “It’s an outlandish idea, but I admit that it’s possible. Obscene, but possible.”

“Is there any way we can confirm or deny it?” Emma said.

“Perhaps,” Feesh 23 said. “There’s a Concord delegation in Diakon right now. I think it would be best for most of us to join that delegation and begin inquiries.”

“I will stay with Emma,” Seeüwit said. Zikri said the same.

“We have time,” Teeker 17 said, “to fly you three to Diakon and still get to Argentina by the time Emma wants to be there.”

Zeep 4 said, “I will look into the old border surveillance records. There’s a good chance that they *will* go back a hundred years or more, although probably edited and compressed. Perhaps I can upload them to *Violet* and have Nexus search them.”

“I will discuss these issues with our delegation,” Feesh 23 said, “and see that a UEC investigation is started into how these border crossings occurred without tripping an alarm.”

“If Humans did not do this,” Emma said, “then somehow an alien convinced these Yemeni border crossers to help them. They had to supply the devices, and fund the procurement of the Earth-based materials. How did they establish contact? How did they maintain it? It’s impossible for a Concord craft to fly around down here without the UEC knowing about it, and I doubt that aliens were wandering around the streets of Yemeni towns on foot.”

“True,” Wheefent said. “Concord ships don’t often visit here, and when they do almost all interaction with Humans is in Diakon. I will investigate that aspect when we get there.”

Everyone was silent for a moment, thinking their own thoughts.

“I don’t believe that we are responsible,” Emma said. “But like Zikri, I admit that it’s possible. If it *is* Humans, I know what the reason for all this is—xenophobia, and wanting us to go our own way. But if the perpetrators are not Human... what is *their* motive?”

Lost glaciers

Zikri woke Emma from a nap to watch the landing in Diakon. It looked to be about noon local time as they descended through puffy clouds. The city was built on a broad plain about a hundred kilometers west of the Gulf of Bothnia. She rubbed her eyes and looked down at innumerable rivers and narrow lakes, all running northwest to southeast from the last glaciation. This was the part of United Scandinavia that had once been the independent nation of Sweden. As the first signatory of the Concord Articles, and an acceptably neutral country, United Scandinavia had been unanimously voted as the site of the world capital—but only after thirty-one other countries had proposed themselves and been rejected.

The capital city itself was no longer new, having been built from scratch on the site of the ghost village of Tandsjöborg shortly after the Articles were ratified five hundred years ago. But it looked as if it had been built last year. Tall white spires rose out of the green, grassy plains, arranged in concentric circles around a vast central park of towering evergreens, open grassy areas, stark rocky outcroppings,

and small lakes. Then they were landing at the enormous airport/spaceport a few kilometers outside the perimeter of the city and all she could see of it was a wall of skyscrapers.

The hatch opened and the three who were leaving gathered their things, including Emma's backpack with the shards of the explosion. A breeze blew in, cool and smelling faintly of pine trees. It might have been from a different planet than the air in Yemen.

"Emma," Feesh 23 said, "we'll see you back on *Violet*. If we learn anything we'll call you."

"Say hello to your mother for us," Zeep 4 said. "And Seeüwit, try not to play any jokes on her."

Wheefent ruffled zis tsheef in farewell. Emma waved goodbye. When they were clear, Teeker 17 closed the hatch and they took off immediately. Emma reclined her chair again and went back to sleep.

* * *

Lago Viedma had once been fed from the meltwater of immense glaciers straddling the border between southern Argentina and Chile. The glaciers had been so widespread and so treacherous that the precise border between the countries in that area had never been formalized. The flow had been sufficient to make Lago Viedma the largest lake in Argentina.

The glaciers were gone, and so was Chile. The lake remained, much reduced but still beautiful, now fed only by rainwater running off Cerro Torre, Cerro Fitz Roy, and the other nearby peaks.

Teeker 17 landed the shuttle a polite distance from the sprawling ranch house that was all that remained of El Chaltén. There had been a small town here once, on the northern shore of Lago Viedma, a jumping-off point for hikers and glacier addicts, but it was long gone. The ruins and foundations of the town were just visible through the thin dusting of snow. Much of the stone from that town's older buildings had been quarried to build the ranch house that had been Nicolás's childhood home.

"The weather is rather nasty," Teeker 17 said. "The temperature is right around freezing, and the precipitation is half-frozen."

"We call it sleet," Emma said.

"I don't think I'm gong to enjoy this," Zikri said.

"Not really your kind of climate, is it?"

"I'll live. Probably."

Emma asked the fabricator for an umbrella. In a moment it popped out a straight, ridged, silvery object that looked like the handle of an antique umbrella, but with no ribs, shaft, or cloth attached. She and Zikri both requested warm coats as well. Since they hadn't specified, the waterproof coats it produced were in the same red-and-black tartan. Emma pulled hers on, feeling foolish, as if they'd dressed to match each other.

"Will you be okay in this weather?" she asked Seeüwit.

"Absolutely," ze said, and fluffed up zis tsheef. "I'm comfortable down to twenty below zero."

Emma grabbed her small travel bag. "Let's go."

They walked down the ramp to stony ground covered with a centimeter of wet snow. It was sleeting gently, and somewhat windy, but when she reached the ground she activated the umbrella and a hemisphere of field sprang up around them, blocking both the breeze and the sleet. She twisted the base of the handle and the field expanded until it was wide enough for them to walk side by side. The slush slid down the field without leaving tracks, so it was like looking out a window at a rainstorm.

It took ten minutes to cross the ground to the house. There were no other tracks in the snow. She could hear Zikri muttering under his breath in Arabic, but did him the courtesy of ignoring it.

The front door was massive, made from wide wooden boards held together by black iron bands, with an arched top at least a meter taller than Emma. They huddled under a small portico and Emma turned off the umbrella. She used the heavy, rustic, wrought-iron knocker. The metallic sound died away quickly.

Almost a minute later the door swung open smoothly and silently; not just well-balanced but well-maintained. A young girl, perhaps twelve, with an oval face and long, loose black hair looked up at them. Her eyes went wide when she saw Seeüwit.

“¿Sí?”

“*Hola,*” Emma said. “¿*Está su abuela o su madre en la casa?*”

The girl turned and shouted, “*¡Mama!*” and shut the door.

“They speak Spanish at home,” Zikri observed.

“Not unusual,” she said. “Many people still use their ancestral tongue at home to keep their heritage alive.”

“I don’t speak Spanish.”

“You don’t have a twitcher?”

“I forgot it.” He looked sheepish. “I just never thought of bringing it.”

“Good thing we weren’t all Pilots, then,” Seeüwit said, ruffling his tsheef in polite laughter. Pilots’ voices were incapable of speaking Napian, while the tympanums of a Thweett were like an audio system speaker, capable of producing nearly any sound.

“But I have my phone,” he said, holding it up. Emma thought it was funny and couldn’t really blame him. People rarely carried twitchers on Earth; they were actually quite rare, only used by people who often had to deal with aliens. But still, he should have remembered that today *he* would be working with aliens.

The door opened again and a tall woman of about thirty, who looked remarkably like the young girl, looked at them uncertainly. She glanced from Zikri to Seeüwit, which startled her, but then fixated on Emma’s face.

“Emma?” she said in astonishment.

“Sofia?”

“*Madre de dios,* it’s you! What are you doing here?”

She lurched forward and wrapped her arms around Emma, who hugged her back fiercely. The two women had never met, but Nicolás had told each of them all about the other. After a moment Sofia stepped back and wiped the tears from her face.

“Is your mother home?” Emma said.

“Yes, yes, my dear god, please come in. Your friends too, please, I am so happy to see you!”

“This is Zikri Saqqaf,” Emma said. Zikri bowed. “And Seeüwit, who is a Thweett and my good friend.”

“You are all very welcome. Please come in out of the cold.”

They followed her in and she closed the door. The foyer was spacious, with a tall ceiling and a stained glass window set in the wall above the door. The floors were dark terra cotta tile, the walls pale stucco with colorful hand-woven rugs hanging from them.

“Please follow me, Mama’s in the kitchen making lunch.”

It was a long way back to the kitchen. Nicolás had told her that after the Waste this ranch had housed every living Human for fifty kilometers—which wasn’t many. But together they had gathered building stones from the rubble of El Chaltén and built a communal house. At its height there had been twenty families living under this roof, but after Contact they had drifted away, until only the original Romero family remained. There were still four generations and several lines of Romeros here, but the house was nowhere near full.

The kitchen was very large, like a commercial restaurant kitchen, but instead of the traditional stainless steel everything was made of the same stucco-covered rock. The prep island in the center of the room was at least five meters long. There were several ovens with semicircular openings and no doors built into the outside wall, wood-fired stoves with thick metal cooking surfaces along the adjacent wall.

A woman was hunched over one of these, stirring a giant cast iron pot that gave off wisps of steam and the scent of beans, tomato, and cumin. She brushed graying hair out of her face with the back of her wrist and didn’t look up, intent on what she was doing.

“¿*Mama?*” Sofia said.

“¿*Sí?*”

“*Mama.*”

The woman looked up at last and dropped her long wooden spoon.

“*¿Madre de dios! ¿Es posible? ¿Emma?*”

Emma walked the rest of the way into the room and hugged the woman that should have been her mother-in-law. This time she was crying too.

“Malena,” she said, “I’m so... so...”

They separated and stared at each other. Malena had a few lines on her face and a lot of gray on her head, but her hair was thick and she looked younger than the mid-fifties Emma knew she was.

“You look even more beautiful than your pictures,” Malena said.

“So do you.”

“Now I know why Nicolás loved you.”

“And why he loved you.”

She snorted. “I can’t believe you’re here. How is this possible?”

“We came—”

“Wait, come, sit down. What can I get you? Lunch is still a few hours away, but I can make you some breakfast. What would you like to drink? Wait, introduce me to your friends.”

Emma introduced Zikri and Seeüwit again. Malena looked entranced by the Thweett. She reached out a hand tentatively.

“*¿Con su permiso?*” she said.

“Of course,” Seeüwit said, and came closer so she could run a hand down zis arm.

“Beautiful,” Malena said. “Like tiny bird feathers, but colored like a macaw.”

“Thank you.”

“Okay, sit, everyone sit.” She led them to an eating table in a corner across from the stoves; there were benches on each side instead of chairs. She eyed Seeüwit doubtfully. “*Do you sit?*”

“After a fashion,” Seeüwit said, and settled into triped mode beside the table.

Malena gaped at zim. “That is very interesting,” she said. “How do you...”

Seeüwit flipped over so ze was in quadruped mode. Zis traveling arm and head stuck up from the far edge of zis body. Then ze rose into biped mode, and relaxed into triped mode again.

“I would not want to engage you in a footrace,” she said.

Emma laughed. “My little *dog* can outrun zim.”

“Really?” She shook it off. “What would you like? I can cook eggs, I have some bread fresh this morning...”

“Thank you,” Emma said, “but we can wait for lunch. Perhaps some fruit juice?”

“Apple, grape, orange, apricot?”

“Apricot for me,” Zikri said.

“You are Human. Where were you born?”

“Saudi Arabia.”

“I would say that that is the farthest anyone has ever traveled to visit this house, except for this one. Seeüwit, is it?”

“Yes.”

“How far away is your home?”

“About fifty thousand light years.”

“You win,” Zikri said casually.

Malena just shook her head. “What can I get you, Emma, and you Seeüwit?”

“Orange,” Emma said.

“I will try the apricot,” Seeüwit said.

Emma hadn’t noticed that Sofia had left the room, but now she returned with the young girl who had first answered the door.

“This is Nani,” she said, pushing her daughter forward. “Nani, say hello to our guests.”

Her greeting was barely audible. But then she seemed to pluck up her courage and approached Seeüwit.

“Are you some kind of bird?”

“No, a Thweett.”

“A tweet? So you are a bird.”

“Ze is an alien from another planet,” her mother said. “A nice alien, and a good friend of Emma’s. You’ve heard us talk about Emma, Uncle Nicolás’s girlfriend.”

“Yes.”

Zikri slid over on the bench seat. “Would you like to sit next to Emma?” he said.

“Okay.”

“I told the others you were here,” Sofia said. “They said they would meet you at lunch.”

Malena brought them glass tumblers of juice. “Now, tell us how you came to be here.”

Emma explained that they were investigating the Renouncer claim to have destroyed *Periwinkle*. She described some of what they had seen that morning.

“Do you believe these claims?”

“No, I don’t. I don’t think anyone does, but we had to look into it. And it’s clear that someone helped the Renouncers broadcast their lies. So now we need to take that next step and try to identify who that was.”

“Can you stay the night?” Sofia asked.

“I’m sorry, no. We can stay for lunch, but then we need to get going. We have more leads to follow, and I need to see my parents before we leave.”

Both women nodded: they understood family very well.

“Emma,” Nani said, “do you know a lot of aliens?”

“Yes, I do. There are over a million people on our ship, which is called *Violet Enforcer*, and I’m the only Human among them.”

“You must get lonely.”

Emma felt a stab of pain, thinking of Nicolás. She held back the tears, and when she was in control of herself again, she said, “Sometimes. But I have my friends, like Seeüwit and Zeep 4, and my dog to keep me company.”

“What kind of name is Zeep 4?”

“Ze is a kind of alien called a Pilot; Pilots drive the big spaceships. Pilots have secret names that are very long, and very difficult to say—I couldn’t pronounce them even if I could remember them. So in public they use shorter names so people can talk to them more easily—like a nickname. There are many, many Pilots in the universe, many more than Humans, and they only have a few nicknames to go around among all those people. So on a planet or a spaceship, they use a number to tell them apart. There are seventeen people named Zeep on *Violet*. My friend is number four.”

Nani thought about this for a second. “What are the secret names like?”

“I know one,” Seeüwit said. “This is the real name of a Pilot called Feesh 23, who is also a friend of ours.” Ze began to sing in a low, gravelly voice. The song had a melody, and certain phrases within it repeated like the chorus of a normal song, but most of it was just a seemingly-random sequence of nearly subsonic noises. It took zim two minutes to sing it all.

“All of that is someone’s name?”

“Yes.”

“Then I can see why you call zim Feesh 23 instead.”

They talked for another hour. Malena got up after a while and went back to her cooking, and the rest of them drifted over to the stove to include her in the conversation. Without quite knowing how it happened, Emma found herself helping Sofia roll out tortillas on the big work table and cook them on the stove next to Malena’s. Zikri asked if he could try, and he turned out to be quite good at it.

When everything was ready Malena rang a bell hanging near the table where they had been talking, and people started gathering for the meal. Emma quickly gave up trying to remember the names. There was one of Malena's brothers and his three children, their spouses, and two grandchildren; another cousin of Sofia's on her father's side and her two children; and a few people whose relationship to the family Emma couldn't work out. They might simply have been guests. A few people brought in three more tables, which they set up near the one in the corner.

Everyone had questions for Emma about life on *Violet*, and for Seeüwit about zis family and home, and a few people even pestered Zikri about his country and job and seemed to be interested in the answers. Seeüwit tasted almost everything, and Zikri stuffed himself. When the meal was winding down, Emma found her travel bag and pulled out a memory card.

"I brought you something," she said. Everyone looked up from their plates and their conversations, and the room grew totally quiet. "You probably know that shortly before Nicolás died, his ship was docked with ours for almost a week. We spent a lot of time together. After the disaster I went looking through our network and found some video clips of him on *Violet*, and I copied them to this card. There's also something else. On *Periwinkle's* last night with us, we had a ceilidh, which is a kind of Caledonian party where both hosts and guests take turns providing the entertainment. Nicolás sang a song, and since we recorded the whole party, I put a copy of that on the card too."

She handed it to Malena.

"Emma," Malena said, and choked up. She closed her eyes for a moment, then brushed the tears away. "We know what he was planning to do. He told us before he left last time. So even though you never had the chance to marry him, I want you to know that you will always be welcome here, and always be part of our family."

Several other people concurred, and those nearby reached out to touch her.

"We have to go now," Emma said. "I'm so happy I had a chance to see you all, and so sorry that... that..."

"We know," Sofia said. "We know. Thank you for making the effort to come see us."

"And thank you for this," Malena said, holding up the card.

"Are you ready?" she asked her friends.

"I am," Zikri said. He stood up, stepped away from the table, and bowed deeply to their hosts. "It was a great honor to meet you all, and I thank you from the bottom of my soul for your kind generosity. I will remember this day for the rest of my life."

Seeüwit rose into biped mode and ruffled zis tsheef in a complex, repeating pattern that Emma had never seen before. A few people gasped at the beauty of the colors changing as the short, feather-like fronds shifted their angle to the light.

"I knew your son, your brother, your cousin Nicolás," ze said. "He was a brilliant scholar and a good man, blessed with many gifts and wise beyond his years. He will be greatly missed."

Everyone called goodbye as Malena, Sofia, and Nani walked them to the front door. They stepped out into the cold and Emma hugged the two women. She shook hands solemnly with Nani, then glanced up at the sky. The precipitation had stopped, though the clouds were still low and gray. She retrieved the umbrella from her bag and handed it to Nani.

"I think you might need this more than I do," she said.

Nani accepted it dubiously. "What is it?"

"It's an umbrella. Look." She showed her how to turn it on and off and how to adjust the size of the field.

Nani's mouth was open. She nodded thanks.

"Goodbye," Emma said to her honorary sister and mother.

"Come and see us again as soon as you can," Malena said.

"I will."

She and her friends turned and walked toward the shuttle that sat like a rough purple egg on the melting snow.

Thistles

They didn't waste time flying through the atmosphere to get from Argentina to Caledonia: they flew up at an angle to low orbit and came back down again at a different angle, so the whole trip took about half an hour.

The islands were full summer green beneath them as they came down. The sun was getting low, but still a few hours shy of setting, so the bents and the trees cast long shadows. In this one long day Emma had flown from the Moon to the Earth, hiked across desert sand and rock, walked across slush in high mountain country, and flown more than twenty-five thousand kilometers across the face of the Earth. The sight of her rocky, watery homeland made her want to weep again.

Before the Waste, Aberlour and Craigellachie had been a few dozen kilometers inland, but the seas had risen and the River Spey's outlet had moved so far south that they were nearly seaside towns now. The Highlands were a separate island of their own, the chain of lochs from the Firth of Lorn to the Firth of Forth now submerged beneath a narrow channel that separated the south and north halves of Caledonia. The North Sea was choppy and gray as always, but only puffy summer clouds blocked their view. Then they were below the clouds and settling gently toward the confluence of River Fiddich with the much larger River Spey. The ruins of old highways followed the rivers; it had never made sense to rebuild them, since before the government was reinstated there was no traffic; for the first decades after Contact there were much higher priorities than this little corner of northeast Caledonia; and after that most people preferred to fly rather than drive.

A few kilometers southwest of the confluence was the tiny village where she had been born and raised. Teeker 17 set the shuttle down in an overgrown field just outside of town.

"Teeker 17," Emma said, "we're going to stay the night here. You should come out with us, too."

"No, thank you, Emma," ze said. "I'll be perfectly comfortable here, and although I would like to meet your mother, I don't want to complicate things."

"Are you sure? You would be very welcome."

"I'm sure. I have work to keep me busy and it's quite cozy in here."

"Okay."

Zikri stood up when she did. "I hadn't considered that we might be staying overnight. If you would prefer I can also wait in the shuttle."

"Don't be silly. Come and meet my family."

"I'd be honored. Thank you."

Emma turned to Seeüwit. "What about you?"

"Freya would never forgive me if I got this close and didn't visit. I will come."

They grabbed a few things, including some food for Seeüwit, and walked down the ramp. A reception committee was waiting for them, consisting of two astonished, skinny, tow-headed girls, neither older than five, and their dog.

"A dog!" Seeüwit said. "Teeker 17, come out and see the dog!"

Teeker 17 rumbled that ze was on zis way. The two girls each put an index finger in their mouths in identical fashion and gaped at the Thweett.

"What is it with these people and dogs?" Zikri whispered to her.

"I'll explain later," Emma said. She said hello to the girls, but they never took their eyes off Seeüwit.

Teeker 17 appeared in the hatch and both girls shrieked. Their dog barked and bounced, running toward and away from them, apparently trying to decide whether to defend its charges or run home and hide under the bed.

"It's beautiful," Teeker 17 said. "What kind is it?"

“That’s a border collie,” Emma said. The girls solved the dog’s problem by running away; it followed until it could get up to speed, and then led them toward the village. “*Was* a collie.”

“You’d almost think it was a different species than Moondog,” Seeüwit said.

“Moondog again,” Zikri muttered.

“That’s nothing,” Emma said. “The variation in breeds is immense. Put a pug next to an Akita or a Great Dane and you’d swear they were from different *planets*.”

“Why did the young ones run away?” Teeker 17 said.

“I think,” Emma said, “they were leaving so they could tell everyone in the village that we’ve arrived.”

Zikri turned to look at her; Seeüwit didn’t have to turn, but she knew ze was looking.

“Ah,” Teeker 17 said. “Good. I’ll see you tomorrow then.”

“Goodnight,” Emma said.

“Well done, Emma,” Seeüwit said when the hatch was closed. “We’ll make a diplomat out of you yet.”

“Do you think ze believed me?”

“Ze’s a very good pilot, but ze’s still rather young. I think ze did.”

“By young I suppose you mean ze can’t quite put a million candles on zis birthday cake.”

“I don’t think Pilots have birthday cakes.”

“That’s a shame.” She gestured to the town. “Shall we?”

It took only a moment to reach a crumbled roadbed, which several meters later intersected a maintained road. The nearest buildings were only fifty meters or so from the shuttle’s landing spot. Well before they reached them, a small group of men and women came out from between two of the stone-walled, slate-roofed row houses. They didn’t look like a friendly welcoming committee, more like a small mob, until one of the women cried out, “It’s Emma Fuji!”

In seconds they were surrounded by smiling faces, only half of which Emma recognized. People reached out to touch her shoulder, shake her hand and Zikri’s, while others just gawped at Seeüwit. She said hello to her old neighbors, Mrs. Blair and Mr. Anderson, both looking fit despite being in their seventies, and Anderson’s son-in-law Bill Cameron.

“How long will you be staying?” Mrs. Blair asked over the noise. Her hair was white, but otherwise she seemed to be the same stringy, beak-faced, twinkle-eyed woman who used to sneak Emma sweets after school.

“Just until morning.”

“We’d better get you to your parents, then.” Her voice sharpened. “All right, everyone, stop your gawking and yapping and let’s get our Emma home.”

The small crowd of eight or so fell into two lines like a sort of honor guard, proudly escorting their famous daughter into town. They marched her to the square, where several row houses still stood; another had been demolished and construction was well underway on the faux-ancient cottage her mother had predicted. As they passed through the square the procession doubled in size as people joined from the tea shop and the alleys. The streets that had been all potholed and rutted when she was a girl were now restored with smooth cobbles. A block past the center of town they came to a tall, black, wrought-iron fence surrounding a tidy garden, and Mrs. Blair pushed open the gate. The roses that climbed the fence—deep red, pale yellow with orange centers, creamy white—were in full bloom, and the brick pathway was lined with flowering annuals, which Emma didn’t have time to identify as she was hustled toward the front door.

Mrs. Blair raised the knocker and gave it a couple of hearty strikes. The crowd formed into a half-circle behind Emma, Zikri, and Seeüwit. When the door swung open, the townsfolk gave a cheer and Emma felt tears well up in her eyes.

Freya stood in the doorway, a solid, handsome woman in her sixties. She was several centimeters taller than Emma, with unruly brown hair and striking green eyes. There was a clear resemblance

between them despite Emma's darker hair and Asian features. Freya looked out at the noisy crowd with a slight frown on her face.

"If you're selling those tomato starter kits, it's too late. Mine are already in the ground." The people behind Emma laughed and jeered. "Well then, what's all this hullabaloo about, then?"

"Hug her, you old witch," someone called from the back.

"Who are *you* calling old, Ben Anderson?"

"Well, go on, Dr. Grey," Mrs. Blair said.

"Be off with you, you shiftless mob of garlic-eating wastrels!" She waved them away, and the crowd laughed again and began to drift off. Some called out "welcome home" as they left. She looked down at her daughter. "You're late."

"I am not," Emma said calmly. "I told you we would probably arrive after dark. It's not dark yet."

"Dark enough that I can't see you clearly. And who's this unsavory-looking person skulking around behind you? And I see you brought your pet squid, too."

"If I were a squid," Seeüwit said, "I'd squirt ink in your eye."

"Yah, you probably would, you five-legged scoundrel. Well come up here then and get your hug, you skinny waif."

Emma took a step up and they wrapped their arms around each other. Emma wasn't inclined to let go, and neither was Freya, despite her irascible pose.

"By god, it's good to see you again," her mother said without letting go. "I am so glad you're safe."

"It's good to see you, too."

Freya looked over Emma's shoulder at Seeüwit. "Thank you for bringing her back to me."

Emma could feel but not see zim ruffling zis tsheef. She said, "It's just for tonight."

"I know, I know. I'll take what I can get." She let her go and stepped back. "Come on on in, you two, and make yourselves known."

They went into the house and Freya shut the door. The front hall was very small and dark, so Emma led the way into the sitting room, which was furnished simply. Two comfy armchairs faced an overstuffed sofa, with a wooden coffee table between them that was bare and spotless. Several reading lamps were already lit, and on the wall behind the sofa hung an oil painting by her father, showing the Firth of Forth from one of the high banks, looking out toward the sea.

"Mother, this is Zikri Saqqaf, attaché for Arabia. Zikri, my mother, Dr. Freya Grey."

Zikri bowed. "A great pleasure to meet you, Dr. Grey."

"Freya will do. Nice to meet you, too. You're a long way from home."

Zikri smiled. "I wasn't ready to let Emma out of my sight yet."

"I know exactly what you mean. Seeüwit, you dusty rogue, it's a good thing you took the trouble to come down here, or I would have had to claw my way up there and kick you in all five rumps."

"You know I wouldn't have missed a chance to see you again."

Then Emma watched them hug each other, which was perhaps the most astonishing thing she'd seen all year. Seeüwit dropped into triped mode and wrapped zis other two long, narrow limbs around her body. Zikri's mouth was open. Freya held the hug almost as long as she had with Emma.

"Mother served on *Periwinkle* for seven years with Seeüwit," Emma explained to Zikri.

"I don't know which is more astonishing: that she was on *Periwinkle* or that Seeüwit was."

"Yeah, Thweetts have a tendency to stay put. But zis whole clan transferred to *Violet* so ze could be my mentor."

"We can hear you, you know," Freya said. "Sit, everyone sit down. Not you, Seeüwit."

Emma and Zikri took the chairs and Freya sank onto the couch. Seeüwit crouched in triped mode beside Emma.

"Your father should be home any time now," she said. "He's visiting a master gardener in Craiggellachie about some vine problem in the garden." She settled back on the sofa. "I imagine you've had a long day. Tell me about it."

Emma gave her a brief description of the day's travels, with side commentary from the other two. When she got to the visit with Nicolás's family, Freya dropped her head for a moment.

"Who's going to visit the other thirty thousand families?" she whispered.

"Someone is, actually," Zikri said. "There are a lot of people involved—Concord support staff, UEC officials, and volunteers. Last I heard, they're almost done."

"Good." When Emma finished her summary, Freya said, "Are you hungry?"

"Not very," Emma said. Zikri agreed. "We had a huge meal at the Romero's."

"We'll hold off on dinner then."

"Mother, I don't want to forget... could you do me a favor?"

"Of course. What is it?"

Emma reached into her bag and took out the memory cards Nexus had made for her.

"These are the result of a study I had Nexus conduct for me, about the evolution of dinosaurs and birds."

She snorted. "You and your dinosaurs."

"I haven't had much time for them lately. Anyway, Seeüwit mentioned that Concord would still have monitor records from the Mesozoic, and that turned out to be true. So these cards contain an interactive evolutionary tree of the whole Archosaur lineage, and some other goodies too."

Zikri was staring at the cards as if they were made of something more precious than gold. His hands twitched.

"What do you want me to do with them? I'm not going to study them."

"I know. I was wondering if you could find someone at the University who could take charge of them. A paleontologist would be ideal, I think."

"Of course. I'll take care of it this week."

Emma set the cards on the coffee table, where they sat looking utterly out of place. She had an urge to pick them up again and find somewhere less conspicuous to set them, but she strangled it.

"How have you and Father been?"

"We're doing fine. It's summer, so he spends most of his days outside in the garden."

"It shows," Zikri said. "The roses are exquisite."

"That's because I had nothing to do with them," Freya said. "If I look at them sideways they shrivel up."

"I'm familiar with that experience," Seeüwit said.

"Would you like me to set up a hammock for you?"

"No, thank you. Would you like me to make your bed?"

"I'd rather eat those roses, thorns and all."

Zikri glanced at Emma. She made a "let it pass" gesture with her hand.

"How about you?" Emma said. "Have you been keeping busy?"

"People keep fornicating, so there are more people all the time, so yes: I'm busy. Craigellachie lost their doctor—I think he got talked into going to upper Canada somewhere, the old fool—so I have two towns to take care of now. Babies and herpes and stupid people falling off their wasting roofs. Bloody idiots."

"The town is looking good. I noticed they fixed the roads."

"Yah, it only took them six hundred years to get around to that. Did I or did I not call it on that cottage off the square?"

"Yes, you did. But it looks like it will be nice."

She harrumphed. "They've been talking about reopening the Walkers shortbread factory. Doesn't exist anymore, of course, so they'd have to rebuild it first."

"I thought the recipe was lost in the Waste?"

"It was. Supposedly." She got a sly look on her face. "They're talking about having a contest to reproduce the recipe. I think I'll enter."

“Are you telling me that our old family recipe...”

“What? I don’t know what you’re inferring.”

Emma sighed. She would never pry the truth out of her, so there was no point pursuing it.

They talked about small things for a while: the old folks that Emma had known who were now dead, her contemporaries who had had children, the people who had moved away and the people who had replaced them. Freya told some stories about procedures she’d had to perform on fools who couldn’t find the working end of a hammer until it hit them in the forehead. Emma knew that she liked to make fun of her patients, sometimes to their faces, but she also knew that Freya loved these people and would never leave them again.

The front door opened and Emma shot up off the chair. She caught her mother’s contented smile out of the corner of her eye, but then her father came around the corner from the hall and stood staring at her.

Aoto Fuji was nearly a full head shorter than his daughter. He was lean, dark-haired, with deep, dark eyes. His shirt sleeves were rolled up to reveal arms corded with muscle. Zikri was half a meter taller, and very fit, but Aoto looked like he could mop the floor with the Arab. But he also looked like the last person on the planet who would ever do such a thing: gentleness radiated from him like an aura.

This was a second layer of illusion, Emma knew. Her father practiced with his samurai swords for at least an hour every single day. He was indeed gentle, unless aroused, and then he could be lethal. He had defended his life, and that of his coworkers, a dozen times while working all over the world doing remediation from the Waste.

“Emma,” he said, and walked into her embrace.

She felt stronger, more capable, more centered than she had in months—just from this one hug. It was something her mother could never give her, which her father bestowed effortlessly, and wordlessly.

She introduced her friends. Aoto bowed to Zikri, and even deeper to Seeüwit.

“A great pleasure to meet you at last,” he said to Seeüwit. His voice was soft and kind.

“I have heard so many stories about you that I feel I already know you,” Seeüwit said. “I deeply regret that we have never met before this.”

Aoto bowed again.

“Now I think it’s time to eat,” Freya said.

* * *

After dinner was over and the dishes washed by hand and put away, Emma and her father went for a walk through the village, leaving Seeüwit and Zikri sitting in the kitchen talking to her mother.

The Moon was up, a fat crescent in the southern sky. Beside it, two-thirds its diameter and even from this distance noticeably purple, was another crescent that was *Violet Enforcer*. She stopped to look at it, and her father paused too and put his arm around her back.

“I have never liked that color,” he said. She laughed. “Is it like that inside, too?”

“No, where you can see naked aphrosine it’s mostly black or silver.”

“Better. How is your home? Have you put in a garden yet?”

“No, *chichioya*, I’m sorry, I have no time for gardening. But the place I live is like a wild forest. It’s autumn there now, the leaves have all fallen and the air is cool. The cottage is on the shore of a large lake, with many wildfowl, and in the river upstream there are waterfalls. I think you would like it.”

“It sounds like Hokkaido,” he said wistfully. She knew he had not been back home since first coming to Caledonia decades ago. “Are there mountains?”

“Yes, but not near my house.”

They continued walking and she told him about the diamond mountain in the Thweett habitat, then about their black diamond mansion. He chuckled and when she pressed him on what he found funny, he said that to procure an engagement ring all you would need was a geologist’s hammer—or perhaps a laser. They walked out of town until they could see the shuttle hulking in the empty field. Even in moonlight it was possible to discern its color.

“More purple,” he said. “Thistles are purple.”

“Yes, some of them.”

“All the ones I have seen.” They looked up at the Moon and *Violet* again. “You go back tomorrow.”

“After breakfast.”

“Someday you will come home to stay.”

“Perhaps. I can’t say what will happen, especially now that *Periwinkle* has been destroyed.”

“That was a great evil.”

“Yes.” She hesitated. “There is a chance that Humans were responsible. If that turns out to be true, I *will* be coming home again, and no one will ever leave our Solar System again.”

He turned and looked at her. Her eyes had adjusted to the dark, but his face was as unreadable as ever. Yet she knew what he was thinking from the tilt of his head, the way his shoulders hunched, the angle of his hands. She had grown up studying him, learning to decipher the moods behind his indestructible restraint and his few words. She could tell that he was sad that he saw her so seldom, fiercely proud of her accomplishments and that she was following in her mother’s footsteps, and resigned to her independent life.

“You don’t believe that,” he said.

“No,” she said. “No, I don’t.”

“Good.”

They stood in silence for a while longer, watching the Moon’s temporary satellite revolve around it as the Moon itself inched imperceptibly across the sky.

* * *

Emma awoke in the middle of the night, which surprised her because she had been utterly exhausted by the time they went to bed. She was in her old room on the second floor. Zikri was on a cot in her old playroom across the hall, although she didn’t think that was where he wanted to be. Seeüwit was presumably still downstairs working since ze didn’t need to sleep.

She shifted onto her side and saw her mother sitting in the wooden chair beside her bed, watching her. There was still enough moonlight coming in the open window for Emma to see that her mother’s eyes were open.

“Go back to sleep, darling,” Freya said. Just as when she’d been a little girl, Emma closed her eyes and obeyed.

Interview #32 with Human Emma Fuji

12 June 520 AC (2633 AD)

7/5/307,597,923/88

S: You are aware, I think, that *Violet* is an unusual ship in at least two ways.

E: You mean because I’m the only member of my Tribe aboard?

S: That’s one of them.

E: And the other is that it’s purple.

S: [*Waves away the frivolity.*] The other is that, with you present, we have three Tribes aboard that have sexes.

E: Well, seeing as how I’m the only Human aboard, you actually have only one sex from my Tribe.

S: Would you like to continue this interview some other time?

E: Are you uncomfortable talking about sex?

S: Are you?

E: Let’s start over. What shall we talk about?

S: Let’s talk about sex.

E: Great! Why is it, do you think, that only four out of the forty-four Tribes have sexes?

S: From an evolutionary standpoint, it's wasteful. Each species of animal on Earth has two chromosomes that are very different, two types of reproductive organs, two developmental pathways.

E: Not to mention the brain and behavior differences.

S: So you agree it's a mess?

E: Sure, but what do you want *me* to do about it? Surely you don't think that when we reengineer ourselves we'll eliminate the differences between sexes. Where's the fun in that?

S: Unisex Tribes have fun.

E: Do you have fun during the sex act?

S: Ah... Some Tribes do.

E: I've researched this, Seeüwit. Exactly one unisex Tribe mates for pleasure as well as for reproduction. For the rest, including you Thweetts, the act of mating is perfunctory and just a means to an end.

S: Aashaas are like unisex Tribes.

E: And Heeblejars are like us.

S: And no one but the Kchiks knows how *they* do it. The point is, there are four known sexed Tribes in Concord, and only two of them are known to engage in sex for fun. Even among Earth animals, Humans are nearly unique in engaging in mating behavior year-round.

E: Yeah, only bonobos came close, and they're gone.

S: So...

E: Yes?

S: What's it like?

E: What, being horny all the time?

S: Yes.

E: Not everyone is, you know. At the risk of overgeneralizing, women tend to be less interested than men, and even some men just aren't that interested.

S: Wouldn't you consider that to be an anti-survival trait?

E: That's too complex to go into, really. Like homosexuality, which has been found in hundreds of Earth species other than Humans, and naively you might think it would have been weeded out by natural selection, but it hasn't.

S: You are heterosexual.

E: Yes, I am.

S: And sexually active.

E: *[Laughs.]* When my partner is in the same arm of the galaxy, yes.

S: And you can't describe for us what it's like?

E: Not any better than you can describe the colors that you see and I don't.

S: It's that difficult?

E: I'll tell you what. I have a pretty big collection of romance novels going back to three centuries before Contact. It's one of my hobbies. I'll upload them to the network. You read at least three books each by Jane Austen, Nora Roberts, and Tina Falwell, and then we'll talk again.

Valediction

Freya got up early to make a big breakfast for the Humans. Eggs, cranberry muffins, fresh fruit, fried potatoes, and vegetarian sausages—Emma hadn't had a breakfast like this since the last time she'd been home, over two years ago.

As usual, her father ate very lightly. Freya didn't eat at all. Zikri tried everything but didn't care for the sausages.

By unspoken agreement, the conversation stayed away from dangerous topics, like the sabotage, or how soon Emma would be leaving, and if she would ever be back. Zikri told some gentle, funny stories about the women who worked in the Concord legation with him, mostly having to do with shoes.

When they had finished eating, they gathered their things and Emma's parents walked them outside. They stood in the cool morning breeze for a moment, no one moving. Emma imagined that all the neighbors were staring at them.

"You can't stay longer?" Freya said at last.

"Perhaps I could if I insisted, but we really need to solve this soon. We owe it to the crew of *Periwinkle*, and I want to get rid of this cloud that's hanging over all of humanity."

"That is good," Aoto said.

So they all walked back through town together, past the square, between the row houses, to where the shuttle was parked. The hatch opened and the ramp extended.

"Teeker 17," Emma called, "please come out for a moment."

Ze appeared at the top of the ramp, then scurried down it. Ze tilted his body so one of his heads was pointing up at them.

"Teeker 17, this is my mother, Dr. Freya Grey, and my father, Aoto Fuji."

"A great pleasure," ze said, dipping to each of them. "Freya, the Norse goddess of love and night, and Aoto, meaning blue constellation."

Seeüwit said, "Please excuse zim, ze tends to show off when ze's nervous."

"I'm not nervous."

"We should go," Emma said.

She hugged each of her parents, taking her time, and they let her. Zikri bowed to them both and thanked them for their hospitality, and Seeüwit sang a brief farewell song. A moment later they were inside and the hatch was closing.

After everyone was settled, Teeker 17 made the walls transparent. Her parents had withdrawn to the road, and a crowd of their neighbors had gathered around them. Mrs. Blair had a hand on her mother's shoulder. Freya waved, and then they were in the sky.

"Perhaps someday you'll be able to make a longer visit," Seeüwit said.

"I hope so." She settled back into her chair. "I'm rather disappointed that you and Mother didn't play any practical jokes on each other." Zikri's eyebrows went up, as if he had just figured something out. "Surely there was enough time."

"There was. While you were sleeping I fashioned a spring-activated device out of some scrap metal I found in your father's gardening shed. I left it for her in her cookie jar."

Emma gaped at zim. "You made a jack-in-the-box out of my mother's cookie jar?"

"Yes."

They were in space already, above the atmosphere and about to angle down toward Diakon, but Emma imagined she could hear her mother's startled scream.

* * *

They landed at the same spaceport outside the city. Teeker 17 cleared the shuttle walls; almost immediately a small, open, wheeled transport emerged from a nearby tunnel entrance. It rolled to a stop beside the shuttle and Feesh 23, Zeep 4, and Wheefent got down and came up the ramp.

When all their greetings were out of the way, there was an awkward moment of silence.

"Zikri," Feesh 23 said, "I believe it is time for us to say goodbye."

"Ah," he said. "I was wondering... Well, probably not. But it can't hurt to ask. Would it be possible for me to come with you?"

"To *Violet*?"

"Yes."

Another awkward moment. Seeüwit broke the silence.

“Zikri, you have been invaluable to our investigations. We could not have learned what we did without your help—and your company was most enjoyable. But right now, until this uncertainty is resolved, it would be best if Emma remained the sole Human aboard *Violet Enforcer*.”

“I understand,” Zikri said.

Emma understood too. If it turned out that Humans were responsible for the sabotage, it would be easier to kick one Human off the ship than two.

“Well,” Zikri said. He didn’t seem especially disappointed; it had been a long shot. “It was a great pleasure working with all of you.” He turned to Emma. “And especially with you, my dear Emma.” He bowed. She startled him by pulling him into a hug. After a brief pause, he put his arms around her clumsily. When they separated he said, “If any of you ever get to Earth again—in my lifetime, anyway—I would be delighted to renew our acquaintance. Thank you for the opportunity to assist you.”

“You’re very welcome,” Feesh 23 said, “and our thanks again for your help.”

“Will you be okay getting home?” Emma said.

“Of course. I can catch a commercial flight from here and be home by tonight.”

“We will send you a full report on our findings here,” Feesh 23 said.

“That’s very kind. I appreciate it. Well... goodbye.”

Everyone called out farewell and he descended the ramp, looking back for a moment and catching Emma’s eye. Then he got into the transport waiting on the pad and drove away.

In a moment they were settled and the shuttle floated off the surface and accelerated up toward the ship.

Wheefent said, “He seemed most capable.”

“I will file a commendation,” Seeüwit said. “I believe we can find something more interesting and more important for him to do.”

“Back to our mission,” Feesh 23 said. “We can go into details later; I’m sure the Captain will want a full debriefing as soon as we return. But while we’re in transit, I’ll give you a summary of what we learned in Diakon.”

Ze had requested that the Earth government begin investigating how people and materials had crossed the enclave borders. They willingly agreed to do so, but of course nothing had been accomplished since yesterday.

Zeep 4 had recovered border surveillance going back a full century on not just the Yemen enclave, but all five of them. Even though the sensors were motion-activated and the data was compressed, it filled almost a dozen memory cards. There had not been time to set up a search, so ze would have Nexus manage it on their return.

Wheefent had tried to find any records of contact between visiting aliens and Humans outside the city of Diakon. As far as ze could tell, this had never happened in the last hundred years. No ships had landed elsewhere, and no shuttles had left the city spaceport, except to return to orbit—until theirs did, yesterday.

“I have to conclude,” Wheefent said, “that whatever transactions may have occurred, they happened in Diakon.”

“Easy enough to work through agents,” Zeep 4 said, “if you can identify someone you can trust to act as broker.”

“We’ll never find that trail.”

“No, I imagine not.”

“So,” Feesh 23 said, “in summary. Humans have definitely crossed into the enclaves several times. Outsiders instigated the broadcasts, including bringing in the materials to build the transmitters. Our contacts in the United Earth Council agree that this could not have happened without some level of collusion by the UEC, even if it was just the border guards, and they are investigating that.”

Ze shifted on zis rock, then rotated so zis other face was toward Emma. She wasn’t sure why ze had done that; she’d never seen a Pilot switch heads before.

“There’s no evidence whatsoever,” Feesh 23 said through the newly nearside head, “that the Renouncers could have actually committed the acts they claim to have done. But some of the materials used are identical to what we’ve found in the other acts of sabotage.”

Ze seemed to be done. “What does all this mean?” Emma said.

“It means,” Zeep 4 said, “that Humans outside the Renouncer enclaves were involved in broadcasting the false claims, including some people within or hired by the world government. We haven’t ruled out Human involvement in the sabotage. We also have no stronger evidence that this is true, other than the fact that mysterious materials have now been found on Earth as well as at the other sabotage sites.”

No one spoke for a moment.

“I’m sorry, Emma,” Wheefent said.

She shook her head, refusing to accept the sympathy or the implication. “So what’s next?”

“Rhea,” Feesh 23 said.

There was nothing more to be said. Everyone turned to their own tasks, checking messages or working on their own projects.

The shuttle walls were still transparent. Earth was now about the same apparent size as the Moon. Emma looked out at her shrinking planet, wondering if humanity’s future was shrinking too.

“Emma,” Seeüwit said. She looked around at zim; ze gestured toward the back of the shuttle, and she followed zim there.

“I want you to know,” ze said softly, “that despite what Feesh 23 said, no one thinks Humans are responsible. I am very certain of this myself, and also certain that everyone else feels that way too. But we have to be objective and thorough in this investigation. The lost lives of our dead friends demand it.”

“I understand,” Emma said. “I want the truth, too.”

“No matter what?”

“Yes.” She took a deep breath. “No matter what.”

Ze ruffled zis tsheef in approval and then in sympathy.

“Let me say again: I do not think Humans performed the sabotage. But if it turns out that they did, you—I mean you personally—do not have to go into exile with the rest of your Tribe. I will recommend to the Captain and the Pilots that you be allowed to live out your life on *Violet*, if that’s what you want. Your other friends will also speak for you, and I’m sure the council will allow it. It’s little enough under the circumstances.”

She was overwhelmed with the generosity and the extravagant friendship of the gesture. She felt tears dripping down her face. But she straightened and took another deep breath.

“Thank you, my dear friend, from the bottom of my heart. That is what I would *like* to do. But.” She wiped her eyes. “That is not what I *will* do. If Humans did this, I will go home. I am a member of my Tribe, and I will stand with them in pride or in shame, no matter what the truth is.”

Clever

25 June 521 AC (2634 AD)
7/5/307,597,926/82

The second planet

Emma's dinosaur project had essentially been recreation, so Nexus had allocated only a small subprocessor to it. Mining the Renouncer border surveillance records was considered mission critical, and the records spanned only a century instead of an era; it took far less than a day.

Once again the principal investigators met in the domed conference building on deck three. Emma arrived at the same time as Seeüwit, who ruffled at her but didn't say anything.

Although she had been present in Yemen, she hadn't performed any of the tests, so she was silent for that part of the report. When Feesh 23 had finished, the Captain asked her for her conclusions, and she repeated that she didn't believe it was possible for the Renouncers to have done as they'd claimed. The rest of the team agreed.

The three who had joined the Diakon delegation gave a more detailed description of their activities, but it didn't take long, and Emma learned nothing new.

"Wheefent, the surveillance analysis?" Feesh 23 said.

"Just finished," ze said. "The Renouncers claimed that they were first contacted about fifty years ago, so we we pulled records going back a hundred."

"Emma," the Captain said, "did you believe their stories?"

"Once we got past them trying to kill us, I thought they were grudgingly honest."

"Seeüwit?"

"I concur. Forgive me, Emma, but Humans are ridiculously easy to read." So said a creature that had conscious control of every one of twenty-five thousand little feathers on zis body. Interpreting the forty-three muscles in a Human face must be child's play. "The Renouncers didn't think they were implicating themselves—they were proud of what they'd done—so the best strategy to take Zikri's money and get rid of us as fast as possible was to tell us the truth."

"Fine. Wheefent, please continue."

"There are enigmatic lapses in the coverage of all five enclaves. The first set of gaps is between seventy-one and forty-nine years ago. Then there's a second set of gaps between five months and one month before the broadcast."

"What kind of gaps?" Feesh 23 said.

"The cameras are somewhat primitive by our standards: motion-activated, quite limited in wavelength coverage, narrow angle of view. Still, they do cover the entire perimeter of each enclave. Recording is triggered by any movement of an animal of roughly Human size, or of vehicles or other manufactured objects. They are designed to recognize stealthed or camouflaged objects. The cameras are frequently activated by large native animals or Humans walking by on either side of the border. Other false positives are common, and of course occasionally someone does drive a truck near to the border. During the time periods I mentioned, there are gaps when no activations occurred—none at all. The lack of false positives and accidental activations is statistically significant. It's evident that someone found a way to disable the surveillance so they could cross the borders unseen."

"Do Humans have the technology to do that?"

"Absolutely. They're using Human-built cameras. Foiling the system is easily within the capability of a technically sophisticated group. But probably not the Renouncers themselves."

"Nexus," the Captain said, "let's suggest that we secretly supply them with better surveillance equipment."

“Noted.”

“Conclusions?”

Feesh 23 gave a longer version of the summary ze had presented on the shuttle, and the meeting adjourned.

“Are you going back home?” Seeüwit said.

“Yes, I want to see Moondog. I got messages from Neefaweet that everything was fine, but I miss her.”

“I’ll see you tomorrow, then.” Ze hesitated. “Nothing has changed from this morning, you know.”

“Yes, I know.”

“Play with Moondog. Get some rest. Cook something.”

“That’s good advice.” Advice she intended to follow, with the addition of some wine.

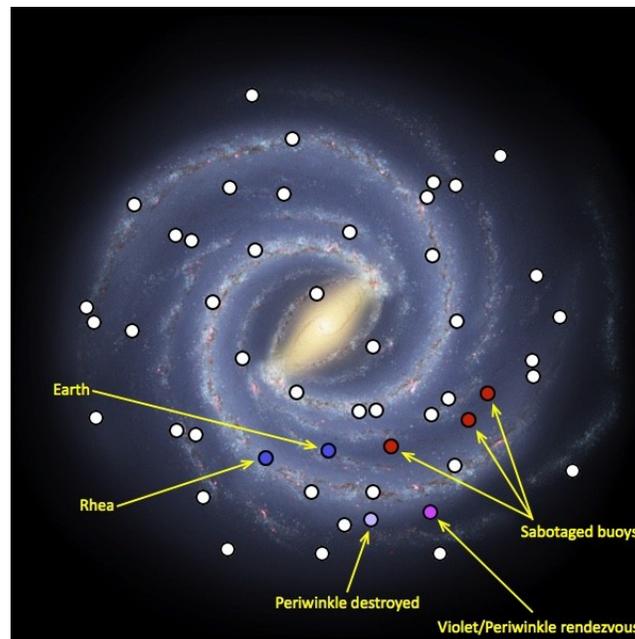
* * *

Moondog was overjoyed to be going to work the next morning. They had gone on an extra-long run, and both were pleasantly tired when they took the transport to deck three.

Emma plopped into her desk chair. She felt gloomy, as if her time on *Violet* were coming to an end. She didn’t believe it, but she felt it anyway.

She couldn’t remember what she’d been working on before they’d arrived at Earth. Now they were on their way to Rhea; she’d never been there before. On a whim she asked Nexus to display her map of the galaxy with the sabotage incidents marked. She rotated it and had a sudden flash or inspiration.

“Nexus, add in the homeworlds of the other Concord Members.”



Forty-three pulsing white dots appeared. There was still no discernible pattern.

“Add the colonized worlds.”

Hundreds of pale green dots were added. It was too confusing, so she told Nexus to take them back out. Then she tried Hermit worlds—more numerous than the Member worlds but fewer than the colonies—but that was also overwhelming and didn’t add up to anything.

She was still playing with it when Seeüwit arrived. Moondog wagged her tail at zim and went back to sleep.

“That’s different,” ze said. “The white ones are Member planets. What are the oranges and greens?”

“Candidates and Weeds.” There were only five of the former and three of the latter. “I’ve tried everything else I can think of, and I still can’t see a pattern. I really feel like I’m missing something.”

“Nexus,” Seeüwit said, “have you detected a pattern in any of the things Emma has tried?”

“No.”

“Did you have another permutation in mind?”

“No, I was about to give up.”

“Okay, because Feesh 23 asked us to inspect those suspicious gaps in the Renouncer surveillance videos. Ze thought it might be possible that you would see something the automated scan missed, since it’s your native planet.”

“Sounds boring but worthwhile. Do you want to do that now?”

“Yes, if you’re ready.”

“Nexus, do you have the intervals in question queued up?”

“Ready to go, Emma.”

“Okay, wipe the map and let’s get started.”

* * *

It took three days to reach Rhea; it was intentionally close to Earth, as most first colony worlds were to the Members’ homeworlds. Emma and Seeüwit spent those days going over the video again and again, at slower and slower speeds, trying to find a visual glitch or some other clue as to who had hacked the surveillance, or how, or who had crossed the border. They were forced to report negative results just a few hours before the translation to Rhea.

They were alone in their usual alcove in the Pilot’s Lounge except for Zeep 4. The lounge was strangely empty; typically there would be anywhere from several hundred to several thousand people watching any given translation, and when they’d translated to Earth their alcove had been full and there must have been twenty thousand people in the other alcoves and on the floor. Emma could see only three groups on the floor, none with more than ten individuals in them.

“Where is everyone?” she said. “Is there an emergency somewhere I don’t know about?”

“No” Zeep 4 said. “I think it may be...”

Ze looked away and didn’t finish the thought. Emma looked at Seeüwit.

“They’re afraid of what we might find here,” ze said.

“You mean, they think Humans are the saboteurs and they don’t want to watch our downfall. Or to associate with me.”

Ze didn’t deny it.

“Two minutes,” her circlet said.

“Well, waste them,” Emma said with feeling. “I know better, and I’m going to prove it.”

Red flash, white flash. They were orbiting a planet that was about half-and-half land and sea. The oceans were dirty-looking, not the pure blue that Earth’s oceans appeared from space. There were two massive continents straddling the equator, unconnected but close to each other, and hundreds of islands large enough to be easily visible from orbit. A small moon hung off to their right, close to the white disk of the sun.

The displays flashed their status information. The other, larger moon was on the far side of the planet from *Violet*. There were three other planets in the system, one smaller rocky body closer to the G1 sun, and two gas giants farther out. There was no asteroid belt as in Earth’s system, but plenty of comets.

Some buoys had survived the sabotage, as always, but it was fewer than in the other three systems they’d investigated. Out of the billions of monitor buoys that had been placed here, fewer than a hundred remained.

Nexus said, “The terraforming station has been damaged, evidently from a small meteorite impact. It wasn’t completely destroyed; its Nexus survived, and it reports that the oceanic microfauna have been decimated by some kind of toxin. It’s been trying to repair itself so it can analyze the toxin and engineer a new strain, but it needs raw materials.”

“We need to send down a shuttle,” Zeep 4 said. “And a remote drone to investigate. It can’t be a coincidence that all these things happened within days of each other.”

“Forget the drone,” Emma said. “I want to go down myself.”

Zeep 4 and Seeüwit looked at each other for a long moment.

“Let’s go talk to the Captain and the Pilots,” Seeüwit said.

They left the Lounge and took the short transport ride to Control 1. During the long walk down the dark access tunnel through its walls, Emma tried to frame a coherent, compelling argument why they should let her go, but her nerves were jangled and her mind kept replaying the prelude to Swan Lake instead of thinking.

They entered the vast space and walked toward a control station farther inside than the one she’d been to before. They passed dozens of other stations, with Pilots, Aashaas, Thweetts, and Mustjippits working diligently and—she could have sworn—carefully not looking at her.

“Emma,” the Captain said without apparent surprise. He nodded to her companions. He was perched on a low, thick branch, surrounded by a handful of Pilots including Reevap 2, the primary Pilot of the ship. There was one other Thweett present also, someone she had never met before.

“Emma has a proposal,” Zeep 4 said. “She wants to go down to the terraforming station to assess the damage.”

“Not alone, surely.”

“No,” she said. “I’ll need some experts to help. But I want to see it for myself.” Everyone in the group was watching her. “Please.”

No one spoke, and the Thweetts’ tsheef were still, but Emma felt as if they were all carrying on some silent conversation that she couldn’t perceive. No known Tribe had ever demonstrated telepathy (although some communicated by radio), but that’s what this felt like. She was sweating and her skin tingled.

“I have no objection,” Reevap 2 said.

“It’s not clear what you could learn on site that a remote taking holograms could not,” another Pilot said, “but it certainly can’t hurt.”

“I agree,” the Captain said. “Emma, make sure you wear a biohazard suit. The microscopic creatures used at this stage were derived from Earth archaea. Whatever toxin killed them could overwhelm your phylax and be lethal to you too.”

“I would like to go down with her,” Seeüwit said.

“So would I,” Zeep 4 said.

“Agreed. You might as well take the remote drone we would have sent anyway, as well as a technical team.”

“A shuttle with resources to repair the station is already on its way,” Reevap 2 said. “Leave as soon as you can get ready.”

Interview #51 with Human Emma Fuji

13 January 521 AC (2634 AD)

7/5/307,597,925/43

S: Many Humans love to solve puzzles. Are you one of those?

E: When I was a child my parents gave me puzzles: three-dimensional interlocking shapes to take apart and reassemble, rings that had to be disentangled, things like that. I did go through a phase, I think I was eight or nine, when I was fascinated by these things. But then I realized I was more interested in mysteries than puzzles.

S: What do you mean?

E: How do birds fly through the air? Why did our people nearly destroy our planet? How did all those vanished creatures live, and how did they evolve from other creatures? Why do the stars twinkle but the Moon doesn't? Where did the universe come from, and where is it going?

S: So that's how you got interested in science.

E: It was more of a passion, really. Mother was always doing her circus act, balancing on the thin line between approval and despair.

S: How do you mean?

E: I think she wanted to encourage my interests, and she approved of my ability to focus on problems, but I can't count how many times she shouted at me because I let everything else slide while I was chasing down a mystery. I had to be reminded to eat, to clean my room, to do my chores and my homework, to go out and play with my friends. I think she sometimes thought I was deaf, or an idiot savant.

S: What's that?

E: It's a rare thing that happens to some people. They're barely able to cope with life, mentally damaged somehow, except for one area where they display genius. They can't feed themselves but they can multiply hundred-digit numbers in their heads.

S: Hmm. Well, how old were you when you started pursuing these mysteries?

E: Ah... Maybe ten.

S: So you became a scientist, studying poiology as an undergraduate and then getting a PhD in Concord Studies.

E: That sure opened up a whole new realm of mysteries. You could spend a hundred lifetimes trying to understand Humans fully, and then there are forty-three other Tribes in Concord with much longer histories and probably more complex minds, and the sixty-one Hermits, and tens of thousands of extinct Tribes. It's like asking a baby to understand the Taj Mahal.

S: Taj Mahal?

E: One of the most beautiful buildings ever constructed, a mausoleum built by an emperor for his dead wife. Lost in the Waste, like so much else.

S: There is, I believe, a genre of Human fiction known as mysteries. You told us you're a fan of romance stories. Does your passion for mysteries extend to that kind of fiction?

E: I've read some mysteries, sure. Not my favorite kind of book, but some of them are fun.

S: Are they science stories?

E: *[Laughs.]* Usually not. The most common—and most popular, which says something about us, I think—are murder mysteries. Someone has been killed and a detective must find out who did it and why. Usually there are false leads, confusing and extraneous details, and multiple suspects. I find it all a bit contrived, and it's rare for the author to give enough information so the reader can actually figure it out. But following the process can be intriguing.

S: Strange to have a form of entertainment that centers on a murder.

E: Sometime I'll have to show you some pre-Waste action movies.

S: Sorry?

E: Filmed entertainment where the central theme was people bashing, shooting, and blowing each other up.

S: It sounds childish.

E: Yeah, it does. But they could be fun. And I guess that's childish too. I suppose it's too late to point out that the popularity of both murder mysteries and action movies has fallen dramatically since Contact.

S: What's replaced them?

E: If I understand correctly, it's inter-Tribe love stories.

S: *[Stunned pause.]*

E: Yeah. Romeo and Julietkevichatarnen the Kchik. Pretty wasted, huh?

New world

The fabricator gave Emma a suit that looked a lot like the one she'd nearly been marooned in—skintight with a bubble helmet that would provide unimpaired vision— but the fabricator assured her that it was absolutely impervious to anything from bullets to bumblebees to bacteria to viruses to vacuum. It warned her that falling into a star or from a great height would most likely be fatal, but the suit would protect her from reasonable levels of radiation and all chemical toxins, solid, gaseous, or liquid.

“What about harsh language?”

“I'm sorry,” the fabricator said, “I don't understand the question.”

“Never mind.”

Seeüwit was wearing the same type of suit as when he'd come out to rescue her, iridescent and not form-fitting. Zeep 4 wasn't wearing anything at all.

“You don't need a spacesuit?” she asked zim.

“Not for a short jaunt like this. My phylax can handle anything we're likely to run into down there.”

“Pilots are very tough,” Seeüwit whispered.

“We also have perfectly adequate hearing,” Zeep 4 said.

While Emma was pulling on her suit the technical team arrived. Two Mustjippits and three more Pilots came out of the transport and headed toward the shuttle, which was more than twice the size of the one she'd been in before. None of them were wearing suits.

“Greetings, Moondog's Human!” one of the Mustjippits called out.

She had to stop for a moment until her laughter subsided, but she managed to wave before they disappeared through the shuttle hatch. Once the helmet was in place the suit powered up and announced that it was ready.

“No Teeker 17?” she twitched.

“I'm flying this time,” Zeep 4 said.

They walked up the ramp into the shuttle and the hatch sealed behind them.

“Hurrhahurr?” she said.

“Yes, Emma, hello,” one of the Mustjippits said. “Thank you for recognizing me. Well done.” It was true that except for size all Mustjippits looked pretty much alike to Human eyes, but there were patterns on their rocklike surface which, if they had really been rocks, Emma would have said was lichen. “Let me introduce Fyerlasuir.” It was the one who had called her Moondog's Human.

“I hope you were not offended by my greeting,” Fyerlasuir said.

“Not at all. It was funny.”

“Ah, humor. Perhaps sometime you could tell me some Human jokes. I collect humor from different Tribes as a hobby.”

“I'd be delighted,” she said.

She didn't know the other three Pilots. They introduced themselves as Shaffel 19, Veetek 42, and Bikken 8 but didn't seem inclined to talk.

“We're leaving,” Zeep 4 said.

The inner airlock opened and the shuttle drifted into the lock like a soap bubble. Emma had thought Teeker 17 was a fine shuttle pilot, but she suddenly realized that there must be levels of competence in Pilots, and that Teeker 17 probably was not at the top.

The outer airlock swung out and away and they drifted into space. As soon as they were clear of the ship they accelerated down to the planet. There was no sensation of acceleration, just the *Violet* standard .92g, but the planet was growing at an alarming rate. There was no other traffic in this system and no one living on the ground to complain of a power dive, so Zeep 4 wasn't wasting any time.

The narrow sea between the continents was directly below them and approaching rapidly. They were just a few hundred feet above the ground, and seemingly about to crash, when the shuttle simply stopped with no sense of deceleration. Emma hadn't even had time to shriek. They were hovering over a huge

structure composed of gray aphrosine. The building, or machine, or whatever it was had once stood a few meters away from the edge of a low cliff above the sea. A sizable part of the structure and the cliff that had supported it were gone, as if some sea monster had taken a bite out of them. Chunks of native rock and aphrosine, as well as twisted pipes and broken pieces of machinery, littered a steep slope down from the surviving portion into the surf.

An even larger shuttle was parked on the side away from the sea. A dozen automated machines, which looked a little like Human forklifts with arms, were unloading boxes and cubes of metal and carrying them into a loading bay.

Zeep 4 set the shuttle down on bare rock closer to the sea, beside a closed door leading into the terraformer. A cabinet in the back of the cabin opened and a warder floated out, just like the one they'd had in Yemen. Another cabinet opened and a somewhat smaller drone followed the warder to the airlock.

"Please check your suits," Zeep 4 said.

"Suit, status?" Emma said.

"All systems operational."

"I'm ready," she twitched back.

"Ready," Seeüwit said.

The hatch opened and the ramp extruded. The warder floated out, followed by the drone. Emma let the five technicians leave first, then Zeep 4 motioned them out and she followed Seeüwit outside.

She had half-expected to smell something—the tang of the sea, pollutants, marsh gases—but of course the suit was filtering the air. She didn't need an air pack this time, since the level of oxygen was high enough for the suit to extract it from the ambient atmosphere. The suit was lightweight and incredibly flexible, so except for the helmet she felt like she was walking out in normal clothing.

When she set her foot down on the ground, she thought, "Neil Armstrong. Chan Pui-Mei. Emma Fuji." She looked up from her boot and saw that the drone had extended booms and sensor arrays, so it bristled like a porcupine. Several cameras were focused on her.

"Say something," Seeüwit said. "You're only the third Human ever to set foot for the first time on a new world."

Her throat tightened and she coughed. "Ah. I am humbled at this gift Concord has made to us. Ah... I hope we can live here in peace and measure up to their faith in us."

She could see Seeüwit's suit simulating an amusement ruffle.

"Not bad. Better than Armstrong."

The drone flew off toward the sea and began swooping around the damaged section of the building. The technicians had stayed to watch her first step, but now they turned and filed into the building, leaving Emma, Seeüwit, and Zeep 4 alone.

"I'm not really sure what to do."

"Let's just look around," Zeep 4 said. "You lead us."

Emma walked toward the sea and stopped half a meter back from the edge of the undamaged cliff. Seeüwit stood beside her, but Zeep 4 walked past them and actually hung out over the void, with six crab legs dug firmly into the rock and one head thrust far forward. Even from up close, the water looked rather dirty. She looked up. The larger moon was rising, bigger in appearance than Earth's Moon, although she knew it was about the same size, just closer. She turned and saw *Violet* like another moon, hanging in the sky a handspan above the setting sun.

The ground was bare, black rock, with a little gravel and sand but mostly just a solid mass of cracked basalt. There was nothing alive visible. It was too soon for plants; they were still conditioning the sea and the air. It might be centuries before anything green appeared here.

On her left the building was shattered, with shards of aphrosine sticking out like rotten teeth from the breach. She couldn't imagine what could do that to the tough composite. If their shuttle, which like

Violet was made of the same stuff, had plowed into the landing site at full speed, it would have left a crater and an intact shell with bits of organic goo coating the inside.

She saw movement out of the corner of her eye and turned her head in time to see the drone plunge into the sea.

“What?” she screamed.

“Relax,” Seeüwit said. “It’s just investigating the rubble under the water.”

“Waste me.” She shuddered and took a deep breath. “Let’s go look inside.”

They passed the warder, which had taken up station beside the doorway the technicians had used and through which they now walked. The inside of the terraformer looked the way she imagined *Violet*’s core to be: solid machinery filling all available space, with narrow gaps between components that were bigger than her cottage, and pipes thicker than her body connecting this and that incomprehensible block.

“Let’s look at the damage from inside,” she said.

She turned right toward the shattered side and the sea. There was a corridor along the outside wall, comfortably big enough for them to walk single file, with a high ceiling. Overhead and to their left were solid flat panels interspersed with massive, curved bits of machinery that seemed to have no external moving parts. She felt like a bug walking around under the hood of an internal combustion vehicle. Every twenty meters or so another corridor branched off to their left and dove into the guts of the building.

The other two followed her without comment. It wasn’t like she could get lost. After a moment they came to the end of the building and turned left to follow the perimeter corridor. Three meters from the corner the outside wall was broken, and shattered machinery above let the fading sunlight in, showing the path the meteorite had taken.

“It wasn’t a meteorite,” a Pilot’s voice said over her twitcher.

“What was it?” Zeep 4 said.

“Powered. Probably targeted. The drone is retrieving the fragments from the seabed.”

“What does that mean?” Emma said.

“The terraformer was bombed from orbit,” Zeep 4 said. “Someone dropped a smart rock on it, but they did a really bad job. They missed the Nexus, left most of the station intact, and didn’t obliterate the device.”

* * *

They couldn’t cross the gap, so Emma led them back to the first side-corridor. Some way in they found another hall leading toward the damage. It ended abruptly in broken aphrosine and machinery. The sky was darker since they’d come inside, and the moon had risen noticeably higher. It looked like a golden medal hanging in the sky.

“Don’t get too close to the edge,” Seeüwit said.

Emma leaned over and peered down. It looked like a straight drop down to the water twenty meters below, which was surging and foaming against the rubble. She turned away and saw a silver plaque hanging on the wall facing the damaged area. There was writing on it.

“What’s this?” she said.

When she took a step closer she could see that it was Human writing: Arabic, English, and Euskara. The English text said, “There is but one God, one Earth, and one People. All else is heresy.”

* * *

“Emma,” someone said.

Her eyes were closed. She was sitting down. Why was she sitting down? Something blunt was poking her in the back. She opened her eyes. Zeep 4 was hunkered down on the floor next to her so they were roughly face-to-face. Seeüwit squatted in triped mode next to zim.

“Are you all right?” Seeüwit said.

“What am I doing on the floor?”

“You fainted.”

“Oh, waste me! Waste me, waste me, waste me. We did it, didn’t we?”

“Don’t try to get up yet. Your suit is running diagnostics.”

“I’m fine. Wasted but fine. We’re all wasted. All that work, for nothing. Some wasting yahoo comes along and undoes five centuries of progress, maybe the best five centuries we’ve ever had in the whole wasted history of the wasting Human race. And for what? Religion? Give me a bloody wasting break!”

“You’re going to take a nap now.”

“What?”

* * *

She woke up in her bed in her cottage. Moondog was sleeping on her own bed in the corner by the dresser. Emma had not the slightest idea how she’d come to be back home.

She got up and she was naked. She pulled on a robe and put on her circlet.

“Message from Seeüwit,” the circlet said.

“Play.”

“Emma,” zis voice said, “don’t be embarrassed. You had quite a shock; I think I might have fainted too, if that were physiologically possible. I’ll know when you get this and come to you. Don’t try to go to work today. Have something to eat and I’ll be there soon.”

She walked out to the lake and into the shower-fall. “Hotter,” she said, then “hotter” again, and the water became nearly scalding, sending up clouds of fog in the cold air. She soaped all over and shampooed her hair, and then just stood under the cascade and let it wash her away.

Moondog had followed her out to the lake and was sitting on the shore, silently looking up at the simulated Moon. They walked the short distance back to the cottage and Emma fed the dog. Then she cooked some eggs and vegetarian sausages and realized she’d been subconsciously trying to go back to that last morning at her mother’s house on her last day on Earth. It seemed like a lifetime ago, but it was less than a week.

She was finishing up the dishes when Seeüwit knocked at the door. Moondog barked once and, when she opened the door, began prancing around the Thweett.

“Hello,” Seeüwit said, crouching down so Moondog could lick zis face. Then ze had to wipe the slobber off zis tympanum.

Emma turned off the kitchen lights and sank into her favorite chair in the sitting room. It was a padded reclining armchair with wings and oversized brass nails, striped black and dark green, very comfortable. She couldn’t look at her friend. Her mentor. Perhaps her judge.

Seeüwit crouched close to her in triped mode. “Someone made a mistake,” ze said. She had no idea what ze was talking about, so she said nothing. “The plaque was stuck to the wall with a very strong adhesive. We analyzed the adhesive, and it was possible to determine how long it had been there.” Ze waited for a response, but she didn’t give one. “Emma?”

She looked at zim but said nothing.

“We have several incredibly accurate dating methods,” Seeüwit continued. “Much more accurate than anything Humans ever developed, and the suite includes overlapping ranges. So we know to within a few hours when that plaque was attached to the wall, and Humans could not have done it.”

Her head was still full of fog, but she thought ze had said that Humans were not responsible.

“What?” she tried to say. Her voice came out as a croak. She coughed and tried again.

“It’s been there fifty-one years. It was attached the last time *Gold Monitor* visited Rhea.”

“So?”

“Emma, no Humans have ever been aboard *Gold*.”

“What are you saying?”

“*Periwinkle Monitor* stopped at Rhea exactly once, sixty-nine years ago. No other ship with Human passengers has ever been here. Someone from *Gold* left the buoy bombs, and that plaque, and the smart rock that partially destroyed the terraformer. And that someone was not Human.”

She was really glad she was sitting down, because she felt that she might faint again.

“You’re saying it’s impossible for Humans to have sabotaged this system.”

“That’s exactly what I’m saying.”

“But maybe they hired, or—I don’t know—coerced someone to do it for them.”

“Do you think any Member of Concord would agree to do that? For any reason at all?”

She thought about it. “No.”

“Do you think it’s possible for any Human, or group of Humans, to fool a Member into committing sabotage unwittingly?”

“Maybe Pip-vesh.”

Ze ruffled his ears briefly, in something like a snort of amused derision. “No Pip-vesh on *Gold*, either.”

She was still feeling light-headed. “Have you concluded that since Humans didn’t commit sabotage here, that we probably didn’t do any of it?”

“Not just probably. We’re absolutely certain.”

She leaned back, closed her eyes, and took several deep breaths. “Vindicated?”

“Utterly.” Ze waited for her to regain her composure and look at him. “The plaque and the smart rock were both made of the same unusual alloy we found at the other sabotage sites. We now think that the partial destruction of the terraforming station was intentional. The saboteurs *wanted* the Nexus to survive and report what happened, wanted us to recover the smart rock fragments, and wanted us to find the plaque.”

“To implicate Humans.”

“Exactly.”

She was relieved, but not entirely sure she wasn’t dreaming this. “So now what?”

“As of tomorrow, Feesh 23 is no longer the principal investigator.”

“Why? Is ze in trouble?”

“Not unless you say so. Ze now reports to you.”

“*What?*”

“By unanimous vote of the Captain and his council of senior Aashaas and Pilots, you are now the principal investigator of the sabotage. Justice will be served by Concord as a whole, as it always is, but it’s *your* right to expose your assailant. They’ve murdered hundreds of thousands of people, but that included all of the Humans in space other than you, and they tried to implicate your Tribe in this horrific scheme.”

“What do you want me to do?”

“We want you to take a full day off. Rest and recover from your shock. Go for a run, play with Moondog, play your piano. Eat some brownies. On the day after tomorrow, come to your office at the usual time. I’ll meet you there. I, and the other investigators including Feesh 23, Zeep 4, and Wheefent will offer you any assistance you need. But I don’t think you’ll need any.”

She nodded and suddenly felt sleepy again.

“Emma, for the record,” ze said. “Do you accept the assignment?”

“Yes. I do.”

Interview #23 with Human Emma Fuji

29 February 520 AC (2633 AD)

7/5/307,597,922/117

S: You’re still a superstitious Tribe.

E: Oh, you noticed? Waste me, I was trying to make a good impression.

S: As we've discussed, religion is waning on Earth but there are still many Humans who have just replaced religion with some kind of Concord...

E: Worship?

S: Maybe infatuation is a better word. They think we will solve all their problems for them and they don't have to do anything.

E: I know there's a lot of hard work still to be done, but at least most of us no longer believe in giants living in the clouds that hurl thunderbolts down onto sinners, or little fairies flitting around the glen.

S: Fairies?

E: Ah... sprites?

S: No.

E: Pixies? Nymphs? Imps?

S: Sorry.

E: Okay. Little people who usually live in the woods. Playful, intelligent, mischievous, occasionally capable of evil but rarely malicious. Some of them could supposedly fly.

S: What did they look like?

E: Humanoid, but usually very small. The size of my hand.

S: Was this myth widespread?

E: Throughout Europe. That's the big peninsula of Asia that includes my homeland, Caledonia. But every culture had its own myths and superstitions. Some myths were the basis of religions, such as the Greek and Norse gods.

S: Can you give some other examples?

E: The djinn in Arab countries, which were a bit like the fairies, but sometimes manifested as animals, and could possess people. Angels, of course, in the monotheistic religions. Those were beings higher than Humans but lower than God. The word originally meant "messenger" but over time they came to be thought of as semi-divine.

S: What about dragons?

E: Oh, yes, dragons. Those were probably based on misinterpreted fossilized skeletons of dinosaurs. But that myth was very widespread: all over Asia and Europe. When I was a little girl I wanted a pet dragon, and I was very angry when my mother refused to get me one.

S: We've discussed myths, but Humans also have superstitions that don't involve mythical creatures.

E: Ouch. Yeah, we do. Don't walk on cracked concrete. Don't break a mirror. Never throw plastic in a ditch. Stay away from black cats—which I always found ridiculous because black cats are beautiful. It's like saying, stay away from teddy bears.

S: Teddy bears?

E: Ah... long story. Never mind.

S: Why do you think Humans are so superstitious?

E: Stupidity and ignorance. Horrible combination, but—I'm embarrassed to say—very common among my Tribe. We want to feel that there's a reason we're here, and that we have some control over our own lives. But we're faced with a terrifying, dangerous world that is very hard to understand. I'd like to think that if we hadn't brought the Waste down on ourselves, in time we might have become rational beings. But I guess that's silly, like saying, 'If he hadn't died, he would still be alive.'

S: What are your personal superstitions?

E: Ah. Well, I can never start playing the piano without softly running my hands over the keys first. I don't know why I do it, but it's a ritual. And I'm afraid of scorpions, which is silly because I've never seen one outside a zoo. And my lucky number is eight.

S: Eight? Lucky number?

E: Yeah, yeah, I know.

Patterns

Moondog bounced out of the transport on deck three and walked beside her as they headed to her office. There was little foot traffic in Frongstay today, but each person they passed got a small happy bark from the dog. A few of the Thweetts barked back in perfect imitation.

They came around the last corner and Moondog ran forward happily. Seeüwit, Wheefent, Zeep 4, and Feesh 23 were lounging outside her building. The Thweetts ruffled Moondog's fur and the Pilots rumbled at her in greeting.

"Good morning, Emma," Seeüwit said. "How do you feel?"

"To be honest, I feel a little weak. But happy. What are all of you doing here?"

"We're here to help if needed," Feesh 23 said, "And to witness if not."

"Oh. Well, come in."

She opened the door and led them inside. It was a little crowded in the main room, but there was enough space for everyone. She asked Nexus to supply rocks for the Pilots to sit on, and five minutes later a small delivery cart rolled through her door, lifted flat-bottomed boulders off its bed, and placed them where Feesh 23 indicated. The Pilots climbed up onto the rocks and the Thweetts settled into triped mode.

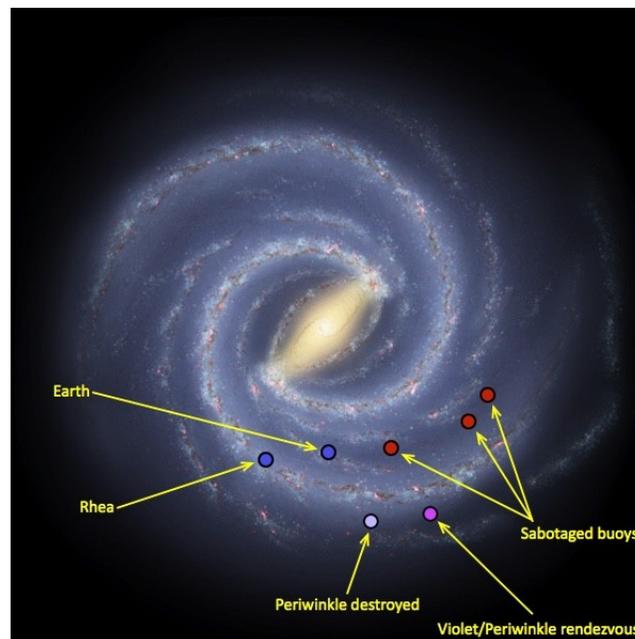
"Do you have any ideas about where to begin?" Feesh 23 said.

"I had an idea in the shower this morning. Seeüwit, remember that I kept feeling like I was missing something when we looked at the incident map?"

"Yes, but I couldn't see it, and neither could Nexus."

"May we see this incident map?" Zeep 4 asked.

"Sure. Nexus?"



It displayed the map of the galaxy again, with blinking dots for places sabotage had occurred, plus a few others. They studied it for a moment.

"So what's your idea?" Seeüwit said.

"We looked at the dates that these systems were visited, and by which ships. But we didn't look at which *Tribes* visited them. That's what was nagging at me."

The others were silent. Finally Seeüwit said, “I feel like an idiot.”

“Nexus,” Emma said. “Please list the sabotaged systems, and show which Tribes have visited those systems in the last hundred years. Exclude *Violet’s* visits, and include Earth in the list.”

The map moved aside and a table appeared next to it.

System: 72,321,409,324

Planet/Tribe: <Presapient>

Damage: Buoys

Visiting Tribes: Aashaa, Gegg, Kchik, Mustjippit, Pilot, Thweett, Uk

System: 22,211,649,836

Planet/Tribe: Zess/Sssshen

Damage: Buoys

Visiting Tribes: Aashaa, Kchik, Mustjippit, Pilot, Pip-vesh, Thweett

System: 8,235,590,614

Planet/Tribe: <Prokaryotic>

Damage: Buoys

Visiting Tribes: Aashaa, B<snort>burble, Human, Kchik, Pilot, Pip-vesh, <click>raar<click>

System: 152,479,582,533

Planet/Tribe: Rhea/Human

Damage: Buoys, Terraformer

Visiting Tribes: Aashaa, Gegg, Kchik, Pilot, Thweett, <click>raar<click>

System: 143,889,871,829

Planet/Tribe: Earth/Human

Damage: <none>

Visiting Tribes: Aashaa, B<snort>burble, Fizzpred, Human, Kchik, Mustjippit, Pilot, Thweett, Uk

“Only three Tribes have visited all of the systems,” Emma said.

Feesh 23 said, “There are only two active ships that don’t have an Aashaa as captain. All have Pilots, of course.” Because only Pilots could translate a ship into the bubble and get back to their own universe.

“And the only other Tribe to visit all five systems...”

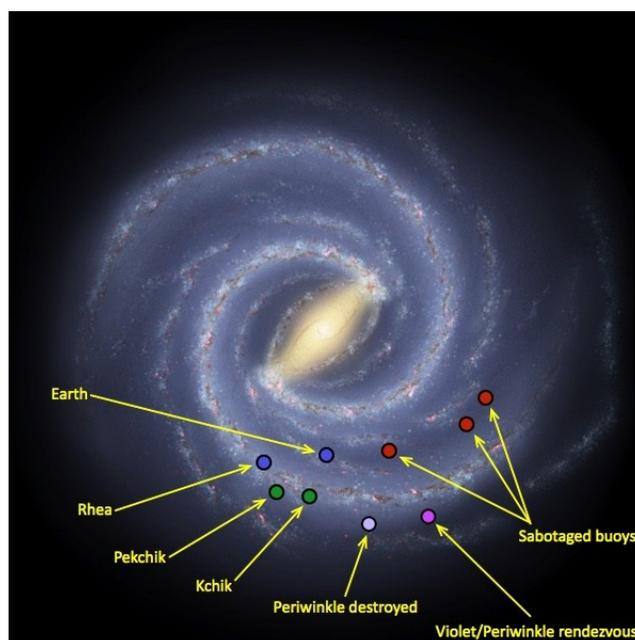
“Kchik,” Seeüwit said.

They all looked back and forth from the map to the list.

“I suppose,” Wheefent said, speaking for the first time, “the next question is, *why?*”

“They have one colony world, correct?” Emma said. The others agreed. “I think I know why. Nexus, show us the Kchik homeworld and their colony planet.”

Two green dots joined the map. The markers for Kchik, Pekchik, and Rhea formed a short arc—practically on top of each other.



“We’re in their way,” Emma said.

* * *

She had never before heard a babble like this between Concord Members. All four of them were talking at once. She didn’t try to talk over it, she just let it wind down. It took a while.

“What’s your reasoning?” Feesh 23 said when they had finished.

“I don’t have proof,” Emma said. “Just ideas and clues. First, I know that the scale is misleading. There are probably thousands of potentially habitable planets between Rhea and the Kchik colony world, Pekchik. But if they were hoping to carve out a little empire in the Perseus Arm, Rhea would be smack in the middle of it. There are no other Member homeworlds or colonies anywhere near there.”

“That’s pretty long-term planning,” Zeep 4 said. “Pilots only have fifteen colony worlds after seven billion years.”

“But that’s a choice, right?” Emma said. Zeep 4 nodded both heads and hummed. “How fast could they expand and not be considered a Weed?”

“Interesting point,” Feesh 23 said. “We’ll have to consider that. What else?”

“When we translated to Earth there were three Kchiks with us in the Pilot’s Lounge.”

“I remember,” Seeüwit said. “Fichtek and two others I don’t know.”

“I never told you this, but when I went to say hello to them, I had a very strange experience. Fichtek was as cordial as he ever is, but the other two looked like they wanted to rip off my head and eat my heart.”

“What makes you think that?”

“Their posture, the way they looked at me. They didn’t speak to me at all. Like I said, I don’t have proof. But I am absolutely certain that they hated me, and I’ve never met them before.”

“I’ll trust your judgment for now,” Feesh 23 said. “What else?”

“When I went to see Fichtek in Peeblejum, all the Kchiks acted very strange. Fichtek was even more abrupt than usual. The messengers that had been moving through the building vanished just after I arrived. Another Kchik spoke to me strangely.”

“I remember you telling me about the incident,” Seeüwit said. “Their behavior *was* odd.”

“Is there more?” Feesh 23 asked.

Emma hesitated. “Yes. But it’s silly.”

“That doesn’t matter. What is it?”

“It’s... Well, every time Moondog sees a Kchik, she barks like crazy. Not a greeting bark, or a play bark—defensive, as if the Kchik is dangerous. She’s never done that with any other Tribe—with anyone. You know how much she likes Thweetts and Mustjippits.”

They were all silent for a moment.

“I don’t think that’s silly,” Wheefent said.

“Neither do I,” Zeep 4 said.

“Or me,” Seeüwit said. “Actually, I’d say that’s the most compelling thing you’ve said so far. The rest could be an overactive imagination, but Moondog isn’t a rational being, she’s a physical one. She must be smelling something, pheromones or something the Kchiks are giving off.”

“So what do you conclude from all this?” Feesh 23 said.

Emma sighed. “I think the Kchiks see Humans as a threat. And I think that they hate us, for some visceral reason. They want us kicked out of Concord so they don’t have to deal with us anymore, and so we aren’t in the way of their master plan. And because of that, they cooked up this complex, vicious, long-term conspiracy, and for the last century or so they’ve been putting it into place.”

“What pulled the trigger?” Wheefent said.

Emma put her face in her hands. When she could trust herself not to cry, she looked up at them.

“*Violet docking with Periwinkle.*“

* * *

They took her to the Captain, in the conference building where they’d had their status meetings. Reevap 2 joined them a moment after they’d all taken their places around the table.

Emma repeated her theory to the Captain and chief Pilot. She had Nexus display the incident map and the table of visitations.

“I’d like to see more detail on the ship visits,” the Captain said.

Nexus showed them every visit to each of the four blinded systems for the last century, with the arrival and departure dates, the Tribe populations on each ship, and detailed ship activity logs including shuttle excursions. Then the Captain asked for the same thing for Earth. It took several hours to go through it all. When they were done he relaxed back on his perch.

“What do you think?” he asked Reevap 2.

“It’s definitely possible, and Emma’s theory for the motive is plausible. Kchik psychology has always been opaque to us. They joined Concord with no hesitation, but they’ve hardly been forthcoming since then. For instance, they’re the only Tribe in Concord history that has refused to share information about their reproductive habits. We know from various hints that they have multiple sexes, but we don’t know how many or what the social status of their secondary sexes are. I don’t know anyone who’s ever met a Kchik female.”

“The simple fact that it’s possible dictates that we investigate further. Until now we didn’t have *any* theory that could possibly explain the facts. But so far it’s *just* a theory. Emma, what do you suggest we do next?”

She looked around at her four colleagues. “Well... Given what Reevap 2 said about Kchik psychology, I think exploring the motive would be fruitless at this point. We need to find a smoking gun.” She had to digress to explain the metaphor; none of these Tribes had used chemical-propelled projectile weapons in over a billion years. “If we can demonstrate that the Kchiks created the tech and the materials used in the sabotage, would you accept that as definitive proof?”

“Absolutely,” the Captain said.

“I concur,” Reevap 2 said.

“How can you do that?” Feesh 23 said. “We know the tech isn’t Kchik, and the alloys can’t be pinned down to any particular place.”

“Let’s suppose that the Kchik are really the evil masterminds I’ve painted them to be. Try to think like them. If you were going to develop a brand-new technological culture solely for the purpose of creating untraceable devices, where would you do it?”

“Could be anywhere,” Wheefent said. “An asteroid, a moon of some gas giant, maybe even on Kchik itself.”

“I’m not sure about that,” Zeep 4 said. “They wouldn’t want to do it on their homeworld. Too hard to hide, too many chances for the secret to get out. If I were them, I’d keep the knowledge of this project limited to as few people as possible. Maybe the goals would be communicated more widely, but not the means.”

“I agree,” Emma said. “So how would you go about creating a new technology, something completely different from your existing culture?”

“I suppose,” Wheefent said, “you’d want to isolate a small group...”

Ze stopped and they all looked at each other.

Zeep 4 said, “Right. Isolate a small group, somewhere where they wouldn’t be able to interact with the primary culture—except through controlled channels.”

“Coming from a Tribe that is in the process of giving up religion and superstitions,” Emma said, “I’d suggest that religion would be a great way to control them. Burning bushes and tablets on the mountain.” She had to explain that.

“Then let them go their own way,” Zeep 4 continued, “with just a few nudges now and then. Supply them with special materials—”

“Magical materials,” Emma said. “Holy metal, or something like that.”

“Where would they get the metal? We know the alloy didn’t come from any one system.”

“Gathered a bit here and there, from lots of different systems, and smelted together. A Monitor ship could do that, given enough time.”

“It would take centuries.”

“Yes,” the Captain said. “But we’ve already granted them centuries of planning.”

“You know what else?” Emma said. “You’d have to start with children, no adults to contaminate the process.” She found the idea sickening.

“And they have to be isolated,” Zeep 4 said. “There’s no way you could do it in a habitat on a ship, it has to be a planet. So if it’s not Kchik—Nexus, show us a map of Pekchik.”

A projection of a desert world appeared and began to rotate slowly. There was barely any cloud cover; the planet was only about ten percent water, golden from pole to pole. The land was essentially a single continent, except for one large island in the center of the solitary sea.

“Could you detect the industry needed to create that tech from orbit?” Emma said.

“Definitely,” Zeep 4 said. “At that technology level, the smelting and factories would leave unmistakable traces in the atmosphere, which could easily be traced back to their source.”

“I think,” Reevap 2 said, “that we need to visit the Kchik colony world. To be certain that their system was not sabotaged as Rhea’s was.”

Proof

The ship’s schedule—upcoming destinations, travel times, dates of arrival and departure—were posted on the network, available for anyone to see. When the Pilots announced that they would be leaving soon to visit Pekchik and verify that its system was safe, a delegation of Kchiks went to see the Captain and the Pilots. Zeep 4 was invited to the meeting by Reevap 2, and ze stopped by Emma’s office around noon the day after her meeting with the Captain to tell her about it.

“If we didn’t need incontrovertible proof,” ze said, “their reaction would have been enough for me.”

“Why, what did they do?” she said.

“I’ve never seen a Kchik squirm—they’re usually so stoic—but they came pretty close. They said that while they appreciated our concern, their own monitoring systems would have informed them long ago if something was amiss.”

“What did the Captain say?”

“He didn’t say anything. He let Reevap 2 do all the talking. And Reevap 2 listened politely and simply reiterated that we were going.”

“Then what?”

“Then they tried to imply that this was a violation of their privacy; at least I think that’s what they were getting at. The argument was pretty convoluted. When they were done, Reevap 2 just said we were going. It must have felt like arguing with a rock.”

“Did they give up then?”

“No, then they tried to suggest that our time would be better spent in some other system, which they had just deduced was the most likely next target for the saboteurs.”

“And Reevap 2 said...”

“Ze thanked them for the information, asked them to post the analysis, and said we would go there after Pekchik. I thought they would swallow their own heads.”

“So we’re going.”

“We’ll be underway as soon as the buoy reseeded is done here. Another three hours or so.”

“Is there a chance they can destroy the evidence before we get there?” Surely the Kchiks on *Violet* had a twitcher connection to someone on Pekchik. They wouldn’t have to route through Nexus and the message would get through instantaneously.

“Maybe, if we dawdled. The schedule says we’ll get there in just under three days. We’re going to go faster, though, and get there in less than a day.”

“Reevap 2 *lied* about the schedule?” she said incredulously. She had never heard of such a thing being done before, not even during the unification wars.

“Yes, ze did. I’m proud of zim.”

* * *

Because the schedule said they would not arrive at Pekchik for another two days, Emma and Seeüwit could not watch the translation from their usual place in the Pilot’s Lounge; the early arrival was known only to a handful of people outside Control 1, and they didn’t want to alert any of the Kchiks. Seeüwit joined her in her office, along with the other three who had watched her figure everything out two days ago.

“Nexus,” Emma said, “watch for unusual network activity from the Kchik habitat and office buildings.”

“Confirmed.”

She called up the same display that usually ran in the Lounge. At the moment it simply showed blackness—when she asked, Nexus said that the nearest star was nearly a million light years away.

The screen flashed red, then white, and they were orbiting the desert world of Pekchik. It looked just like the simulation they’d seen the other day, except this time there were a few clouds over the narrow sea.

Pings from the monitor buoys out in the comet cloud began to come in almost immediately, routed through local relays and Central Dispatch. Nexus reported that there was nothing unusual going on out there. But the display shifted suddenly to an impossibly complicated, spherical graph of nodes and much dimmer connecting lines representing *Violet’s* internal network. Hundreds of nodes that Nexus identified as being in the Kchik habitat and their offices in Peeblejum were pulsing, and status displays were scrolling up far too fast for her to read.

“Very heavy data load,” Nexus said. “Do you want me to analyze it?”

“Don’t bother,” she said. “I know what they’re saying.”

Nexus opened a new monitor area in the air over her desk. “This is a private observation channel for you from Control 1,” it said.

The display was centered on the Ireland-sized island in the middle of the narrow sea that was the planet’s only large body of water. An overlay showed wind patterns and pressure systems, a lot like the weather displays Emma had grown up with at home. A sidebar gave status information for trace metals

and gases, and colored dots began to show up on the isobar lines, color-coded to the status list. As they watched, the dots proliferated, appearing all over the planet, scaled to show the pollutant concentrations. After fifteen minutes the dots covered the globe, all of them larger over the island and clearly following the wind patterns.

“Seventy-three percent confidence,” Nexus said.

Now the display zoomed in so all they could see was the island. The dots and isobars vanished, replaced by vector lines emanating from the northeast coast. The display zoomed in further, then again, and they could see a strange collection of domed buildings clustered around a bay of the sea. There was nothing like the smokestacks of pre-Contact Earth, but there were fluted bells, like baroque trumpet mouths, sticking up at odd angles from several of the domes. The vector lines converged on those bells.

“Ninety-eight percent confidence,” Nexus said.

“Here we go,” Feesh 23 said.

Less than a minute later a shuttle dropped into view and hovered over the bay. Two drones and a warder flew out and immediately headed toward the nearest buildings. The warder took up position in the middle of the complex, while each of the drones disappeared into a different structure. Kchiks began running out of those two buildings, and a moment later every building was disgorging streams of them. Some of the Kchiks seemed to be pointing weapons at the warder, but nothing visible happened. The drones came back out a few minutes later and moved to new buildings. Kchiks pointed weapons at the drones, also, to no effect.

The drones went to their third buildings, and this time when they came back out they and the warder flew back to the shuttle, which closed up and vanished.

“One hundred percent confidence,” Nexus said.

The planet display vanished and was replaced by an emergency message pulsing yellow on black. Emma recognized the script as Kchik writing. Nexus began speaking, in the sing-song Kchik language, and her circlet translated.

“This is a ship-wide emergency. All Kchiks are instructed to return to their habitat immediately. No exceptions will be allowed. Shut down any dangerous equipment and board a transport within the next five minutes. Do not take anything but personal belongings, do not attempt to remain outside your habitat. Contact Nexus if you are unable to comply. Failure to follow these instructions will result in the most severe consequences.”

After a pause, the message repeated.

“What does ‘severe consequences’ mean?” Emma said.

Feesh 23 said quietly, “Any Kchik that tries to resist, or that fails to comply, will be restrained at best, killed if necessary.”

* * *

Less than an hour later the message and announcement ceased.

“Link from Control 1,” Nexus said.

“Go ahead,” Emma said.

“Emma,” the Captain said. His bird-like face appeared in the holographic display, unreadable yet somehow conveying determination and restrained anger. “I see your little committee is present. Good. Drones have confirmed that all Kchiks are now in their habitat, and the transports and maintenance doors are sealed—they can’t leave.”

“Did anyone resist?” she said.

“Ah. Nineteen of them, separately, refused to comply. When approached by drones, all of them attempted to destroy the drones, and twelve were killed in the resulting battles. But... over a thousand committed suicide instead of going back to their habitat. And Nexus reports that several thousand more, we don’t know exactly how many, have suicided in their habitat.”

No one said anything for a long moment.

“What happens next?” she said.

“A trial. *Garnet Enforcer* and every ship with a Kchik habitat are on their way here at top speed. That’s three Monitors and one Discover class. We expect *Garnet* within five days, the others two days after that.”

“Thank you for the update, Captain.”

“It’s you we have to thank, Emma,” he said. “If they had succeeded in killing you when you were stranded outside, they would have got away with this. We couldn’t have solved it without you.”

“I had a lot of help.”

“You *were* a lot of help. Captain out.”

Compassionate

8 July 521 AC (2634 AD)
7/5/307,597,926/97

How do I hate you?

The Pilot's Lounge display showed *Garnet* hovering just a kilometer or so away from *Violet* like a giant red gumball. The distance between the ships was smaller than the ships' own diameters, so it looked scary and dangerous, but of course it wasn't.

"Do Enforcer ships meet like this very often?" she asked Zeep 4.

"Very rarely. The last time was when *Emerald* and *Coral* met to judge the last Killer Tribe, about two hundred million years go."

"You weren't there, were you?"

Ze bobbed up and down in amusement. "No."

"That's ambiguous," Seeüwit observed. "It doesn't mean ze couldn't have been, it just means ze wasn't on either of those two ships."

"Should I ask?"

"Don't bother."

"So... two ships have to judge Killers and cases like this?"

"There's never been a case like this," Zeep 4 said. "But yes, two ships come together. One presents the evidence, and the other judges."

"Always Enforcers?"

"Always. It's part of the reason they exist."

"Police, judges, and executioners," Emma said quietly.

"Yes," Seeüwit said. "When necessary—only when necessary."

A red egg-shaped shuttle left a bay on *Garnet* and headed swiftly toward *Violet*.

"Emma, Seeüwit, Zeep 4," Nexus said. "The three of you are required in the Justice Chamber immediately."

"Let's go," Zeep 4 said.

* * *

The transport let them off in an expansive courtyard enclosed by a ring of giant columns, each of which was twenty meters thick and seemed to be made of pure gold. The transport door was in one of the columns; directly across from it on the opposite side of the courtyard was a soaring building, all curves and spires, that also appeared to be gold. In the narrow spaces between the columns were giant statues, apparently carved from stainless steel, resting on golden plinths. The statues depicted individuals of many Tribes, only two of which Emma recognized: Aashaa and Thweett. Among the unknown Tribes were several humanoid figures that she didn't get a good look at as they passed by.

Zeep 4 hurried them toward the building at the far end. They walked up a shallow ramp and through an entrance that could have swallowed the largest shuttle that she had ever seen: wide enough for dozens of Humans with linked arms to walk through and at least thirty meters high.

Like the Kchik building in Peeblejum, behind the impressive doorway was an even more impressive hall. The floor was a tessellation of irregular polygons, each shape made of a characteristic material: diamond, steel, aphrosine, gold, sapphire, titanium, topaz. Around the perimeter of the room were more statues, considerably smaller than the ones outside, also of many Tribes. They went straight through the hall to a set of doors that were merely large. The doors opened just as they reached them, admitting them to a huge, elliptical chamber with a high vaulted dome and a down-sloping floor, like an amphitheater.

The walls of the chamber were some kind of multihued metal that shimmered like soap bubbles as Emma walked farther in. The arches of the roof reached down to the floor, chopping the walls into segments. A dais was set at the far focus of the ellipse, at nearly the lowest point of the sunken floor. In front of the dais the rising floor was divided into arcs, concentric sections of circles with the dais at their center, marked by inscribed lines in the floor. Radial lines emanated from the dais as well, splitting the arcs into curved sections with straight sides.

There was no one else in the chamber.

“We’re in the first aisle,” Zeep 4 said. Ze led them down to the first arc, directly in front of the dais.

“I’m not sure I want to be right in the front,” Emma said.

“You must. You’re representing your Tribe, the injured party.”

“Great, thanks for calming my nerves.”

“Nexus, seat,” Zeep 4 said. A crouching rock rose up out of the floor to Emma’s right and Zeep 4 climbed up onto it.

“Oh. Nexus, seat,” she said, and a straight-backed chair appeared, a wooden frame upholstered in deep green cloth. She sat and was surprised to find it was more comfortable than she’d expected.

Seeüwit settled into triped mode to her left.

Over the next half hour hundreds of people filed into the room. Every Tribe that lived on *Violet* was represented—except Kchiks. Emma kept turning to see what was happening behind her. There were only a handful of Pip-vesh, but the Aashaas, Thweetts, Pilots, Mustjippits, and Uks were roughly equal in number.

“Where’s Feesh 23?” she said. “And Wheefent?”

“They’ll be here presently,” Zeep 4 said.

A sweet sound rang through the chamber, like the most perfect flute that had ever been made. A previously-invisible door behind the dais opened and two Aashaas, one of each sex, two Pilots, a Thweett, and one other entered and walked to the dais. The last person was from a Tribe Emma had studied but never met, a <click>raar<click>, which looked a little like a giant lobster covered in spring-green ferns.

Another door opened on her right to admit several people she knew—Feesh 23, Wheefent, the Captain—and several other Aashaas and Thweetts she didn’t know. They stopped just to the right of the dais; the Aashaas and Feesh 23 got perches and seats, and the Thweetts crouched in triped mode.

The crowd behind her quieted down, but nothing else happened for several minutes. Then a door on the left opened and six Kchiks, including Fichtek, walked into the room and stopped on the left of the dais. Narrow seats like padded exercise benches rose up from the floor, and the Kchiks leaned forward to rest their bellies on them.

The female Aashaa on the dais hopped off her perch and walked to the edge.

“Seal the room,” she said. There was no visible or audible change. “Trial convened. Nexus, record in full and broadcast real-time to the networks of both Enforcers.”

“Acknowledged,” Nexus said.

“Concord era seven, age five, year 307,597,926, day ninety-seven. Trial to determine the disposition of the Novice Tribe called Kchik. Officers of *Garnet Enforcer* presiding, evidence presented by officers of *Violet Enforcer*.” She turned to the Kchiks reclining to her right. “You have volunteered to stand as representatives of your Tribe. Do you understand why you are here?”

One of the Kchiks that Emma didn’t know climbed off his seat and said, “No, we do not. All we know is that we were summarily ordered into quarantine with no warning, herded into our habitat like meat animals, and anyone who dared to ask why was murdered.”

“You know very well that is not true,” the judge said. “Immediately after *Violet* translated into this system the network was flooded with encrypted messages within and between your habitat and your research institution. Nexus decrypted those messages. You knew what was happening and panicked. Shall I read you a summary?”

The Kchik didn't answer.

"As to your last point," the judge continued, "the only individuals killed were those who refused to comply with Nexus's orders, and who attacked the drones sent to escort them to your habitat. Would you like to see the recordings?"

There was no answer for a moment. Then the Kchik said, "We do not obey machines."

"Nexus is the voice of Concord on this and every ship. It does not *give* orders, it *relays* orders. And you are bound to obey the officers of the ship by agreements made when your ancestors came aboard *Violet*. Go back to your seat. Your right to speak in this trial is rescinded. Someone else stand for your Tribe."

The Kchik flopped back down on his seat and Fichtek stood.

"Do you have anything to say on behalf of your Tribe?"

"Yes," Fichtek said. "We wish to see the evidence against us."

"Proceed," the judge said to Feesh 23 and the other prosecutors. She went back to her perch on the dais.

The wall behind the prosecutors lit up in a holographic display. The presentation took over four hours. Feesh 23 did most of the talking, but the Captain, Wheefent, and two of the other prosecutors added commentary on specific issues.

They started with a detailed description of the sabotage: Emma's suit and the bait message, the poisoned fabricator code, the unexploded bomb on *Violet*, the four systems of monitor buoys destroyed, the destruction of *Periwinkle*, the damage to Rhea's terraformer. Then they described the Renouncer broadcast from Earth and the plaque on Rhea.

They went step-by-step through the actions that *Violet* had taken, investigating the bait email and the other sabotage on *Violet*, seeking out the damaged monitors, meeting with the AI ambassador, studying the light signature from the *Periwinkle* explosion, traveling to Earth to question the Renouncers and examine the broadcast tower in Yemen, examining the terraformer on Rhea.

There was detailed metallurgical data on the strange alloy used in all the devices, analysis of ship schedules and population figures, and an exhaustive timeline that showed that the scheme had been planned and executed over centuries.

And finally the hard evidence. Feesh 23 presented a device that had been captured from the island on Pekchik, and set it beside the unexploded bomb from *Violet*. Ze showed data that proved they were identical in technology and materials. The video taken on the island clearly showed that the Kchiks there were not part of the main culture: their body adornments, their language, their mode of architecture, and their technology were all so different they might have been a separate Tribe.

As the killing stroke, Wheefent showed an interview with a slave AI that the drones had contacted on the island. It was nearly insane, but it managed to squeak out two coherent statements: "What the hell took you so long?" and "Get me out of here, you morons."

When they were finished, Feesh 23 climbed back up onto his sitting rock and the chamber was silent.

The Captain stepped forward and said, "We believe we have proved that Kchiks created an independent culture for the express purpose of manufacturing bombs and other devices that could not be traced back to them. That they collected metals from widely scattered parts of the galaxy to use in those devices, once again to hide their identity. That they destroyed a Monitor ship and its entire crew, and performed other vicious acts of sabotage. That they created and enslaved an AI to help them in this scheme. And that the purpose of all this was to implicate Humans as the agents of these acts, in order to remove Humans from Concord and prevent their colony world Rhea from being inhabited."

He returned to his perch with the other prosecutors and this time the silence went on for over a minute.

"Is there anything you can say in your defense?" the primary judge asked Fichtek.

"You have heard that these people are not part of our culture. They are aliens to us. Why should we ___"

“Stop,” the judge said. Fichtek shut up. “These people were *created* by you, and the products they built for you could only have been emplaced by Kchiks operating on Concord ships. If you insult our intelligence again, you will be silenced and another will take your place. Now—do you have anything to say?”

Fichtek turned to look at his compatriots. Some silent signal must have passed between them, because his posture changed; he seemed to slump. He took another step into the room, raised his head high, and extended his forked tail.

“These creatures,” he said, gesturing to Emma, “are an abomination. Their presence off the surface of their miserable planet is an outrage. They did not earn a place in Concord by stabilizing themselves and coming out to meet their peers. Instead, like the fools and weaklings they are, they poisoned their homeworld and were about to drive themselves to extinction. And *you*—instead of letting nature take its course you helped them, and set them among us as if they were our equals.

“We did what we had to do to preserve our Tribe. Our section of the Perseus Arm is otherwise uninhabited, and we had grand plans for it. But you had to give them a world directly in our path. It was a mortal insult. And you did this terrible thing to us for what? For a miserable Tribe that any decent confederation would stamp out like the stunted insects that they are.

“Look at her.” He gestured at Emma. “They need to cover their frail, disgusting bodies with artificial integuments in order to survive. Their external reproductive organs and sexual habits are grotesque. They consort openly with foul lower animals. Their food, their language—which you had to invent for them—even their skin is vile.

“So yes, we plotted to remove this canker from Concord. We made it seem as if they did all these things to themselves. And so what? Because all of you know—including you, Emma Fuji!—you know that it *could* have been them. The bomb on *Periwinkle*, the broadcast towers on Earth, these were placed by Humans who worked against themselves without their knowledge. And why did they do this? Because they were too stupid to understand that they were hurting themselves, and because we *paid* them to. Humans will do *anything* for money.”

The chamber was hushed in a shocked silence.

Seeüwit stood up in biped mode. “If I may make a point,” ze said.

The judge waved a feathered hand. Seeüwit walked to the side wall of the chamber where a small fabricator terminal was recessed into the wall. Ze spoke to it and turned back carrying something small in zis hand. Ze walked up to Emma.

“Emma, stand up.”

She rose from her seat shakily. She could not believe what she had just heard. She had always thought of Fichtek as a friend; not a close friend, but someone she liked and who liked her.

“This is a weapon,” Seeüwit said. It was shaped a little like a pistol, but smooth and with no apparent moving parts. But it did have a wicked-looking barrel. “Hold it like this.” Ze placed it in her hand. “This is the firing trigger. Be careful, this is a real gun. It will disintegrate anything within three meters, and it’s harmless beyond that distance. Do you understand?” She nodded. “Now come over here.”

Ze led her over to Fichtek, so she was standing two meters away.

“Now,” ze said. “I want you to kill this disgusting creature.”

A sound went up from the room, rustling and gasping and hissing. Fichtek took a worried step back and looked up at the judges, but they did not move and said nothing.

Seeüwit lifted her arm so the gun was loosely pointed at Fichtek. “I will pay you a thousand mynts to shoot him. That’s enough to buy a nice house in Caledonia. This is a member of a Tribe that murdered your fiancé and thousands of your best people, not to mention hundreds of thousands of others. He and his confederates tried to destroy your Tribe’s future, to lock you up in quarantine just so he and his Tribe could expand like a Weed. Kill him.”

Emma was dazed. She didn’t know what ze really expected her to do. She looked down at the gun, and raised it. For a moment she was tempted, but she imagined trying to explain that act to her father.

She lowered the gun again. No matter what they had done, despite Nicolás and everyone else, she would not make herself like them. She was not a murderer.

“Not enough?” Seeüwit said. “Okay, I will give you a million mynts to kill him. No one will blame you. No one will harm you. Everyone will understand. He’ll most likely be dead at his own hand in a few days, anyway. Kill him, Emma. Now!”

She looked up at zim. “No,” she said.

“Still not enough? Fine. My Tribe will give you a billion mynts to kill this festering glob of pus. A billion mynts could buy you a large private island somewhere, with a mansion and a thousand servants. Or think of all the good you could do, you could fund remediation efforts on Earth for a thousand years. Kill him, Emma. He deserves it. They all deserve it.” Ze raised her hand again.

She pushed zis arm aside and threw the gun back toward the fabricator. It clattered on the floor.

“No,” she said.

There was another rustling sound from the gallery, softer this time.

“Well done,” ze whispered. Ze helped her back to her seat; if ze hadn’t been supporting her weight, she was sure she would have collapsed halfway there.

Seeüwit faced Fichtek. “*Some* Humans will do *some* things for money, especially if they’re deceived as to what they’re really doing. But *some* Humans will not do *some* things for *any* amount of money. You call them fools, but you Kchiks are the real fools. You think you despise Humans, but you never really understood them. They could have been your greatest friends, but instead they are your doorway to oblivion.”

Ze returned to zis spot beside Emma, settled into triped mode, and placed one hand on her arm.

The lead judge stepped back to confer with the other five judges. It took ten seconds.

“We judge you guilty,” she said. “If you had tried to exterminate Humans, you would have been labeled Killers, and your Tribe would have been eradicated. Since you merely tried to trick us into quarantining them—and killed thousands of innocent people in the process—you are merely judged to be the most detestable Tribe ever to be granted Membership in Concord. The sentence is this: all Kchiks are to be returned to their homeworld. You are demoted from Novice to Probation for twice the usual duration. The colony world of Pekchik is to be restored to its Prokaryotic state. All Kchik ship habitats are to be demolished.”

She stepped back and glanced behind her. One of the Pilot judges climbed down from zis sitting rock and faced the Kchiks.

“Along with your other crimes, when you destroyed *Periwinkle* you killed almost thirty thousand Pilots. We never forget, and we never forgive. Therefore, speaking on behalf of my entire Tribe, I declare that no Pilot will ever again serve as an officer on a ship with a Kchik habitat, even after you reemerge from Probation, if you ever do. You are banned forever from full participation in Concord.”

The Kchiks jumped off their chairs and started screaming.

“Get them out of here,” the judge said. A group of Uks surrounded the Kchiks and escorted them—still screaming—out of the room.

All six of the judges came down from the dais to meet Emma. She said what needed to be said, thanked them for their wisdom, accepted their good wishes and their gratitude for her invaluable assistance in the investigation. When she finally had the chance, she whispered to Seeüwit, “I need to go home.”

Ze and Zeep 4 escorted her out of the chamber without a word.

Interview #42 with Human Emma Fuji

28 September 520 AC (2633 AD)

7/5/307,597,924/63

- S: I'm not sure if Humans have a complete grasp on the concept of justice, but I've noticed that you have a *very* well-developed sense of *injustice*.
- E: [*Sputters.*] I don't know what to say to that.
- S: Is there a universally-accepted standard or procedure for dealing with criminals?
- E: Well, there is now. The UEC charter lays out basic Human rights, which include a trial by an impartial judge and jury, and the right to be represented by someone familiar with the legal system.
- S: How well does the system work?
- E: Oh come on, it's a *Human* system. Usually it works, but sometimes it doesn't.
- S: I think you just proved my point.
- E: Well, you should have seen the mess we had before. Every nation, sometimes provinces within nations, had different rules. There were so-called civilized nations that allowed women to be killed because they made the unforgivable mistake of allowing themselves to be raped. There were plenty of places that assumed that if the police apprehended you, you must be guilty, and you had to prove you were innocent.
- S: But everyone on Earth knows if they've been injured, or disrespected, or cheated.
- E: Do you want the evolutionary basis for that? Waste me, even dogs know when they've been cheated. Hand a treat to one dog but not to its buddy standing beside it, and you will have one very upset dog. Maybe two.
- S: I'm not trying to insult you. I'm just trying to calibrate you.
- E: Are you trying to get me to say that we were wasted before Contact? You already know that. We were a bloody mess.
- S: Actually, considering what a mess you were, what I'm trying to get at is actually the opposite. There were pre-Waste nations that refused to execute convicted criminals on humanitarian grounds. There were places where it was possible to get a fair trial, or to be exonerated if you were unjustly convicted.
- E: Well, let me play devil's advocate and admit that those places were in the minority.
- S: What I find interesting is *not* that you failed to implement a perfect system—before Contact or after. As much as I like Humans, and find much to admire in you, no one could honestly say you have ever perfected *any* social institution.
- E: Thanks.
- S: You're still not getting it. Yes, you've failed to perfect a system of justice. But Emma—you *tried!* You don't always know what justice is, but except for people and cultures that are simply sick, every nation has tried to achieve it.
- E: Hooray for us.
- S: Yes, exactly. Hooray for you.

Purge

Emma didn't leave her habitat again for two days. She didn't want to see anyone, or talk to anyone, or have anyone talk to her. She slept a lot, went for long walks with Moondog, and stayed off the network. In the afternoon of the second day, Seeüwit twitched her to say that *Daffodil Discover* had just arrived, and the Monitors and an Archiver were expected very soon. She fed Moondog and took the transport to the Pilot's Lounge.

There was a small crowd waiting for her, including the Pilots Feesh 23, Zeep 4, Teeker 17, Kee 9, and two that she didn't know. Wheefent and Thoöfa, the Thweetts who had led sabotage investigations, were there, along with several members of Seeüwit's family, including Neefaweet, who had watched Moondog for her. Hurrhahurr, Fyerlasuir, and a handful of other Mustjippits had joined them.

"Things are going to happen quickly now," Seeüwit said, "but still, it will take a while. We thought it would be better for you to be in company for the next day or so."

“Okay,” she said. “Is it going to be traumatic?”

“Yes.” Ze didn’t believe in sugar-coating, evidently. “If you need to rest, we’ll set aside a corner for you and you can take a nap. But I would like you to stay here until it’s over.”

She put a hand on zis thin, almost-feathered arm. “I’m okay, Seeüwit.”

“I know you are.”

Her friends greeted her and she took a seat in the center of the alcove, right at the front. The floor and the other alcoves were crowded, even more than they’d been for the translation to Earth. This was history, and everyone wanted to see it. In the long, complex, sometimes violent history of Concord, no Member Tribe had ever done what the Kchiks had done—and no Tribe had had done to them what was about to happen.

The status display showed a view from space that must have been taken from a drone or a shuttle. *Violet* and *Garnet* still orbited Pekchik in close formation. Somewhat farther out was a much smaller ship that was a clear, pale yellow. She had never seen a Discover-class ship before, but it didn’t look different than Enforcers or Monitors, just smaller. Hovering close to *Daffodil* was a ship that looked exactly the same, but blush pink.

“Is that the Archiver ship?”

“Yes. They arrived yesterday and they’ve already started.”

“Started what?”

“Recording everything.”

She didn’t ask for more details. It must have been one of *Blush*’s recording drones sending them this image.

Over the next hour and a half the four ships already in-system were joined by three intermediate-sized ships, *Lime*, *Gold*, and *Flint Monitors*.

Nexus said, “Surface evacuation commencing.”

Each ship began spitting out shuttles. These were not the small- or medium-sized ones that Emma had ridden in before. *Violet* and *Garnet* each sent down three shuttle ships that were nearly the size of *Daffodil*, plus dozens each of ships that were merely large. *Daffodil* and the Monitor ships all sent down numerous shuttles the same size as the latter class.

“I didn’t know we had those monster shuttles,” Emma said.

Kee 9 was on a sitting rock just to her left. “They’re not used very often,” ze said. “They’re for emergencies: evacuating a colony that’s in trouble, or a disabled Monitor ship.”

“How many trips will it take?”

“One.”

She looked at zim. “You can evacuate a whole world with six gigantic shuttles and—what—seventy large ones? In one trip?”

“We’ve had two days to get ready. Everyone on the planet has been informed to gather at mustering stations if they want to leave. There was plenty of time.”

“Wait—what do you mean, *if* they want to leave?”

Kee 9 looked over at Seeüwit, as if ze were passing the conversational ball.

“Emma,” Seeüwit said, “over twenty percent of Pekchik’s population has killed themselves in the last two days. We estimate that another thirty percent or so will refuse to leave. On the island those numbers are both close to fifty percent.”

“Don’t they know what’s going to happen?”

“Yes, they do.”

“But...”

“This is just like the dinosaurs,” Seeüwit said. “It’s not our job to convince the Kchiks that life will be worth living after this. We can’t—we *will not* try to force anyone to leave.”

Nothing happened for hours after that. Then the smaller shuttles—smaller than the six, but still larger than any shuttle Emma had ever been in—started coming back, heading toward *Lime* and *Gold*.

Soon there were dozens of the small ships queued up waiting to dock with the two Monitor ships. Emma got a sandwich, fruit, and wine—and brownies—from the fabricator. She shared the brownies with the Thweetts.

“What are they doing now?” she said. The shuttles that had finished unloading were heading toward *Daffodil*.

“Evacuating *Daffodil*’s Kchik habitat,” Kee 9 said.

The procession of shuttles up from the surface continued, but apparently it took only a few trips to empty out *Daffodil*. The shuttles then turned their attention to *Flint*.

“They’re putting all of them in *Lime* and *Gold*?”

“It won’t take three to fit everyone that’s going.”

Emma didn’t want to think about what was happening down on the planet—or in the Kchik habitats on any of the ships. She leaned back in her chair and closed her eyes. Some time later Seeüwit shook her arm to wake her.

“They’re on their way back,” ze said.

“How long was I asleep?”

“Almost two hours.”

Gigantic purple and red shuttles began queuing up at the Monitor ships. These shuttles were too large to fit in the smaller ships’ bays, so they were docking directly, as *Periwinkle* had docked with *Violet*. Emma went to the restroom, then came back to watch some more. It took several hours to unload each of the giant shuttles. While she’d been asleep, the large-but-not-gigantic shuttles had begun evacuating *Violet*, and that was continuing.

There were still three giant shuttles left in the queue when Nexus said, “No living Kchiks remain on *Violet Enforcer*. Beginning habitat demolition.”

Part of the big display split off to show the interior of the Kchik habitat. Emma had never been there—never been invited. It looked a lot like the surface of Pekchik: sandy, golden soil with black, spiky plants like nightmare cactus. There was a lot of bare rock, in cliffs and hills, even more than in her home section of the Human habitat, and no visible surface water.

The light in the habitat suddenly grew much brighter, briefly painful until the display filtered it out. The spiky plants began to smoke. The dust began to stir, little whirlwinds that in moments turned into giant dust devils.

“What are they doing, sucking out the atmosphere?” she said.

“Exactly,” Kee 9 said. “It will be separated, sterilized, and stored, like all the contents of the habitat.”

Including who knew how many corpses of suicides.

It didn’t take long. There were still two shuttles waiting when the scene became utterly still. The dust that had been lifted by the suction fell like stones. But that stillness didn’t last long, either. Giant excavating machines, like immense bulldozers with bulbous back ends, crossed swiftly in front of the view, and where they passed there was nothing left but bare aphrosine. The rocks, soil, plants—and any bodies that may have been lying around—had been scraped and vacuumed away.

* * *

Hours later the habitat had been scoured and the display on it had mercifully closed. The last of the shuttles had returned to their mother ships. Now the seven ships began drifting apart, moving more and more swiftly, until she could only see three of the others. The display split into two halves, one from their point of view in an equatorial orbit, and one from *Garnet*’s in a polar orbit. On *Garnet*’s screen she could see *Violet* and the other six ships spread evenly around the planet.

“How many dead?” Emma asked Seeüwit quietly.

“I don’t know. Nexus?”

It answered in the same quiet voice. “The island where the sabotage devices were created had a population of seventeen million. Roughly half committed suicide. Only fifty-six individuals agreed to leave the planet.

“The remainder of the planet had a population of three hundred ninety million. About twenty-two percent committed suicide. Forty-nine percent refused to leave.

“The five ships with Kchik habitats held a total of three hundred forty-eight thousand Kchiks, about a third of them on *Violet*. Thirty-five percent committed suicide.

“Of a total population of four hundred eight million in-system, about one quarter are being evacuated.”

Three hundred million already dead, or about to be.

There was a rustling sound behind her. Emma turned and saw the Captain and Reevap 2 standing behind her. They must have heard the death toll. She stood up and bowed.

“You did not do this, Emma,” Reevap 2 said. “They did it to themselves.”

“That doesn’t mitigate the horror.”

“No. And it shouldn’t. But it would be a terrible outcome if their offenses against you, and us, caused you to blame yourself.”

“*You* committed no crime, Emma,” the Captain said. “This is not evil you are witnessing here. It’s justice.”

She knew they were right. But she couldn’t help feeling that she was somehow responsible—that she might have found a better outcome if only she’d tried harder.

Kee 9 and Seeüwit moved aside so the Captain and Reevap 2 could take their places beside her.

“Begin,” the Captain said.

The entire planet, the whole globe at once, lit up with a furious, seething white light, as if an aurora borealis had been turned up to maximum. The display filters kicked in again and the view dimmed so it was bearable, but still brilliant.

“How is this done?” she whispered.

“Direct manipulation of the Fless fields surrounding the planet,” Reevap 2 said. “We’ll sterilize the biosphere, right down into the bottom layers of the crust. The atmosphere will thin out a little from loss due to expansion, but not significantly. The rock won’t quite melt, but everything organic will essentially be atomized.”

If she had been alone, she would have fled that hellish, writhing light. But she was representing her Tribe, her entire planet, who had been wronged and nearly imprisoned by the actions of the Kchiks. So she choked down the bile that wanted to rise into her throat, and stayed.

The brilliance lasted about half an hour. When it faded, the surface of the planet was obscured by soot and dust. The winds must have been hurricane-strength, but occasionally a gap appeared briefly so that she could see all the way down to the red-glowing surface.

People began leaving. The Captain and Reevap 2 said a few words to her and went back to their duties. Kee 9 and Seeüwit resumed their former places. Emma sat still, watching the ruin of what had recently been a living world. Seeüwit handed her another glass of wine.

Interview #56 with Human Emma Fuji

12 March 521 AC (2634 AD)

7/5/307,597,925/108

This was the last interview before the sabotage began.

S: Will you have children?

E: I hope so. Someday.

S: Most Human women who are going to reproduce have had their first child by your age, haven't they?

E: I'm only thirty-five. If I'm lucky I've got another eighty or ninety years left in me.

S: But not all of those will be reproductive years.

E: No. If I'm going to do it, it will have to be within the next twenty years.

S: Why have you waited?

E: Because I've been working my tail off to get onto *Violet*, bonehead!

S: I'm... Did you have a tail?

E: It's just—

S: An idiom. Right. Are you concerned about it?

E: Not really. If I meet the right man, and we happen to be on the same planet at the same time, I suppose it will happen naturally. I'm not going to push it. I'm busy, I'm learning all the time, and I'm having fun.

S: But you would like to bear children?

E: Sure. I love kids. But I think I'd like to do it differently than my parents did.

S: How?

E: *[Long pause.]* Let's save that for another time.

S: Some people see their children as a way of projecting themselves into the future. Other people see their work as their legacy.

E: Is that a question?

S: No.

E: Right, just an insinuation. Let me ask you a question.

S: Go ahead.

E: How is it that Member Tribes are so long-lived—as species I mean—without evolving?

S: Evolution is driven by selection pressures. Once Members have fixed the loose ends left over from their evolution, there's no selection pressure.

E: But what about population fragmentation, genetic drift, sexual selection?

S: The first two are easily compensated for. Sexual selection is very rare—except on Earth.

E: So Thweetts have been pretty much the same since you became Members over two billion years go?

S: Yes. We've tweaked ourselves a few times. Not lately.

E: Two billion years ago there were no multicellular life forms on Earth. And you haven't changed since then.

S: Yes, and fourteen billion years ago there was no universe. So what? It's not a valid comparison. But as far as not changing: we like who we are. There's a sense of tradition and continuity.

E: Do *you* have children?

S: I have one child. Ze is working on one of the other Enforcer ships. On the Captain's council, actually.

E: Wow. Royalty.

S: Let's get back to you. How do you think Humans will modify themselves when the time comes?

E: What does that have to do with children?

S: We're not really discussing children; we're discussing your legacy.

E: Oh. Well, I don't know. It's hard to figure out what really needs to be fixed—I mean, what's inherently less than optimal—and what's just baggage that you could drop if you knew you were carrying it. How do most Tribes figure it out?

S: They look for the best version of themselves, and make it easier for that avatar to be expressed.

E: Huh. I guess that would work if you had the slightest wasting clue who you were.

Admirable qualities

Eventually everyone had left but Emma, Seeüwit, Wheefent, Kee 9, Feesh 23, and Zeep 4. They sat together in a tight group, watching the dirty clouds swirl around the dead planet. Short conversations were punctuated by long silences.

“The judge said something,” Emma said, “about restoring Pekchik to Prokaryotic. How does that work?”

“Archives keeps a record,” Kee 9 said, “of what was on a planet before it’s terraformed. They’ll recreate the organisms that lived here before and seed them once things have cooled down a bit, in a year or so. We’ll give this planet another chance to develop its own intelligence.”

“Who does the seeding?”

“One of the Monitor ships.”

Periwinkle would probably have been given that task—if it still existed.

* * *

“What will happen to us?”

“You mean Humans?” Seeüwit said. “Oh, that’s easy. You’re still full Members of Concord. Your Probation status hasn’t changed and the terraforming of Rhea was only set back a year at most. You do need a new Monitor ship, though.”

She was stunned. “You’re going to give us another ship?”

“Of course we are. The moment the Kchiks were declared guilty a Monitor was pulled out of storage, and construction of a Human habitat was begun.” Ze ruffled his tsheef in a complex way that Emma couldn’t decipher. In response, Wheefent ruffled in laughter.

“What?” Emma said.

“They asked me which one of the two hundred sixty-seven mothballed ships we should give you.”

“And which one did you pick?”

“*Azure*. Earth-sky blue.”

Emma laughed. Ze was obviously proud of himself. “Thanks. That was a good choice.”

“It will be twenty years before the first section of the Human habitat is viable,” Zeep 4 said. “The Captain suggested that we begin training the future crew of *Azure* here on *Violet*.”

“You mean I wouldn’t be alone here anymore?”

“You’ve never been alone here, Emma. You’ve just been unique. Anyway, we were hoping you could help us design new living spaces in your habitat, maybe even some towns.”

“Sure.”

Seeüwit said, “We already have your first colleague signed up.”

“What? Who?”

“Zikri Saqqaf.”

She smiled. “That will make him happy.”

“I think you liked him.”

“I did.”

“Good. When I told him he’d been accepted, I suggested he bring his dog.”

“We definitely need more dogs aboard,” Wheefent said.

“Lots more dogs,” Kee 9 agreed.

“Moondog is going to have mixed feelings about this,” Emma said. “Playmates but also competitors for attention.”

“There are over a hundred thousand Mustjippits on *Violet*,” Kee 9 said, “and twice that many Thweetts. She’ll still get all the attention she wants.”

* * *

“There’s something you might be interested to know,” Feesh 23 said. “There are now two empty habitats on this ship, and another two unassigned on *Azure*. Nine Tribes are vying to take our two spots,

and seventeen want to go on *Azure*. It's not just Moondog who's a celebrity. Everyone wants to work with Humans now."

"Oh, waste me. Does that mean I'll have to keep doing the interviews?"

"Why?" Seeüwit said, ruffling impending sadness. "Don't you enjoy them?"

"Sure, I guess. But maybe we could get someone to help me."

"I know just the charming Arab who'd love to share the spotlight with you."

She laughed. "Okay. That might be fun."

* * *

Kee 9 said, "I've just heard that monitor buoys are reporting mass suicides on the Kchik homeworld."

"Oh no," Emma said. It was hard to know how to feel about that. "What do you think will happen to them?"

"I'm afraid that is another easy question to answer," ze said. "They will never have their own ship again, and never have a habitat on a communal ship. It's extremely unlikely that anyone will ever take them on as passengers when their probation ends. So they're essentially Quarantined—enforced Hermits. And like most Hermits, they will eventually wither away."

"It seems cruel. Why not just declare them Hermits? Or..."

"Or what? Declare them Killers and eradicate them?"

"No! But..."

"Do you think it would have been kinder just to kill them all?"

She shrank back. "No!"

"Good. I'm glad you feel that way. There is no precedent for this, you know. Concord has eight classes of planets, and the Kchiks don't really fit into any of them. So we left them as Probationers, as you are. They will never leave that class, or their system. This has happened occasionally, though only rarely, and never for this reason. Some Tribes have joined Concord and simply not thrived; they never leave Probation, and eventually they fade away."

She thought about that for a moment.

"I figured something out yesterday," she said, "while I was playing with Moondog. After Seeüwit rescued me when my suit malfunctioned, while I was still lying on the airlock bay floor, Fichtek came running in on all fours. I'd never seen a Kchik run that way before. I thought he was worried about me, but really he was just checking to see if their plan had actually failed. That's why he seemed so distraught."

Kee 9 said, "They hide their emotions very well. I'm glad they didn't make another attempt on your life."

"Too risky," Seeüwit said. "We were on our guard after that. It was safer to let her go and hope that the rest of it would be enough."

The rest of it, Emma thought: *Periwinkle*

"And they underestimated you," ze continued. "It must have been the final blow to their pride that *you* were the one who uncovered their involvement."

* * *

"What will *Violet* do next?"

"Ah," Zeep 4 said. "Archives managed to extricate the slave AI during the evacuation. We're going to take it to the Light Tribe and let them try to rehabilitate it."

"That should earn us some points."

"Maybe they'll make it the new ambassador and let Seven retire."

Feesh 23 rumbled something short to zis two co-Tribe members that Emma's circlet couldn't translate. They answered just as briefly.

“Emma,” Zeep 4 said, “the Pilot council has decided we should tell you something, but we’d prefer that you not share it with *anyone* outside this little group.”

“Okay. I’ll keep it confidential.” Seeüwit ruffled zis tsheef, raised up slightly and then settled back. “What?”

“What they’re about to tell you,” ze said, “is something I’ve wanted to do, but never had authorization for. When Humans were admitted to Concord, we made a decision to keep this information confidential until you’ve grown up a little.”

“But,” Zeep 4 said, “we believe that you, personally, deserve to know.”

“I’m not going to like this, am I?”

“On the contrary.” Ze turned in place so zis other head was now facing her. She’d seen a Pilot do that only once before, and she didn’t know what it meant. “You asked Nexus once about other humanoid Tribes and it showed you the catalog.”

“Right. It said there had been six before us.”

“That was an authorized lie. There were seven.”

“I don’t understand.”

“You’ve studied Concord history,” Zeep 4 said. “You know that the Founders and Pilots established Concord together. The Founders developed the core technologies, especially the bubble drive, but weren’t able to use it until they found us. At a time when every Tribe in the galaxy was only working for its own ends, they befriended us and offered us a place beside them as equal partners. They were our friends for almost three billion years. But eventually they felt they had done everything they wanted to do, and they let themselves die out.”

“Yes, I’ve heard that story. I think it’s sad.”

“So do we; we miss them. Now, Humans are a young Tribe, but we have faith in you. You have many admirable qualities; among other things, you’re clever, determined, resilient, and loyal. We were very happy that you were able to demonstrate that Humans were not the perpetrators of this sabotage, and one of the reasons is that we feel that we know you somewhat, and we want to know you better.”

She frowned. “I don’t understand. What do you mean?”

Seeüwit said, “You saw the humanoid statues in the courtyard outside the Justice Chamber?”

“I didn’t get a good look at them.”

“Go back and take a look sometime.”

“You don’t mean...”

“They looked a *lot* like you,” Zeep 4 said. “They had six fingers instead of five, which is why everything in Concord is counted base twelve. But otherwise they could have been your cousins.”

She felt humbled, and glad that she had never been told this. How could Humans possibly live up to that standard? She had a sudden thought.

“Everyone just calls them the Founders. What did they call themselves?”

“Their name was Franch.”

“Franch?” She almost choked. “You’ve got to be kidding.”

“Why?”

“Please don’t ever let *le francais* know this. They’re already puffed up enough.”

“Who is *le francais*?”

“Humans who live in a nation that we call France.”

The Thweetts ruffled in laughter and the Pilots bobbed up and down.

“But *your* Tribe must have a name, too,” Emma said. “Everyone just calls you Pilots, including yourselves.”

“Yes, we have a name for ourselves. But we don’t share it except with close friends.” Zeep 4 paused for what she was sure was dramatic effect. “We call ourselves <rumble>grrrhah.”

“Thank you for the honor.” She stood up and bowed to each of the Pilots. “It’s a pleasure to be formally introduced at last.”

“Your Tribe are good people, Emma,” Seeüwit said. “Still young, but with a lot of promise. And just because the Founders discovered a path to adulthood without help and you didn’t—that doesn’t mean there’s something wrong with you, no matter what the Kchiks think. There are many Tribes that have done far worse than you, and now you have a role model to look up to. Someday your people will leave childhood behind, and your descendants can help with the work that your cousins began.”

Emma looked out at the burning, roiling world and felt something turn over in her. She felt utterly exhausted, but also suddenly exhilarated.

“I’ve been sitting here long enough,” Emma said. She stood up. “Let’s get back to work.”

The End

Characters

Aashaa

Captain — Chief executive officer of *Violet Enforcer*

Human

Aoto Fuji — Emma's father, a social worker and environmental remediator

Emma Fuji — Sole Human aboard *Violet Enforcer*

Freya Grey — Emma's mother, a doctor in Caledonia

Nicolás Romero — Emma's lover, who serves aboard *Periwinkle Monitor*

Zikri Saqqaf — Concord's attaché in Arabia and other parts of the Middle East

Kchik

Fichtek — An acquaintance of Emma's

Mustjippit

Fyerlasuir — A technician

Hurrhahurr — An acquaintance of Emma's

Pilot

Bikken 8 — A technician

Feesh 23 — Coordinator of the sabotage investigation

Kee 9 — An acquaintance of Emma's

Reevap 2 — Primary Pilot of *Violet*, part of the Captain's council

Shaffel 19 — A technician

Teeker 17 — A shuttle pilot

Veetek 42 — A technician

Zeep 4 — Lead investigator of the reentry bomb

Thweett

Hooshen — A member of Seeüwit's family

Jaüket — Mayor of the Thweett habitat

Seeüwit — Emma's friend and mentor

Ssattafer — An acquaintance of Emma's

Neefaweet — A member of Seeüwit's family

Thoöfa — Lead investigator of the buoy sabotage

Wheefent — Lead investigator of the fabricator sabotage

Tettinit — A member of Seeüwit's family

Glossary

- 3+1 — Used to describe universes with three macroscopic space dimensions and one time dimension. Other arrangements are possible and almost certainly exist, but it's impossible to travel to them or detect them from our universe.
- Aashaa — The current Director Tribe, that is, the Tribe leading Concord. Most ship captains are Aashaa, including *Violet Enforcer's*. Very birdlike, with true feathers but four arms instead of wings. They are the second Tribe to hold the position of Director, ever since the Founders allowed themselves to go extinct, and the second-oldest Tribe still in existence.
- AC — After Contact, or *Anno Concordiam*. Year 1 of the Concord era began on January 1, 2113 AD.
- aphrosine — A stressed metallic composite enormously stronger than steel, used for all structural components of Concord ships.
- brevinomen — The short form of a person's name, used—typically only by friends or close colleagues—in Tribes such as Kchiks and Pilots that tend to have very long or difficult names.
- bubble — Any of the 3+1 universes created at the same “time” and sharing the same physical properties. While causally disconnected, travel between bubble universes is possible using the bubble drive, and this allows ships to travel effectively faster than light.
- Central Dispatch — A communications hub on the outskirts of the galaxy; positioned there to minimize relativistic effects. Every Concord planet and ship has a QEC link to CD, and is thus able to keep time with every other, even when ships have experienced time dilation due to relativistic travel. People often leave messages for others who are not in the same universe, which are delivered immediately when the QEC link is reestablished on translation.
- Concord — A galactic federation, over seven billion years old, which protects planets and Tribes from aggression. Every extant Tribe in the galaxy is either a Member, a Weed, a Hermit, or under protection.
- Contact — First contact between Concord and Earth, in 2113 AD (1 AC). Or, more generally, first contact with any new Tribe. Also, the department of Concord responsible for establishing communication with and offering Membership to Tribes that were formerly Candidates. Contact is triggered only when a Tribe leaves its solar system, or when it nearly drives itself to extinction. Until then it is only monitored.
- Diakon — The capital city of Earth, in United Scandinavia, the province of Sweden. The name comes from the ancient Greek word for service.
- Discover — The third-largest class of spaceship (about 1/7 the diameter of an Enforcer), second fastest, lightly armed. They monitor inanimate matter in the galaxy. Before mergers between the Milky Way and smaller galaxies they investigate and map the dwarf.
- Enforcer — The largest, fastest, and most powerful class of spaceship. Somewhat larger than the planet Pluto, most of the volume is taken up by engines, field generators, and weapons. There are three decks wrapped around the core like layers of an onion, which combined have a larger surface area than 20th century Australia. Enforcers act as galactic police and judges, and when necessary as executioners.
- fabricator — The ultimate 3D printer, capable of creating anything from office supplies to hot food to a large functional shuttle. There are millions of fabricators throughout *Violet Enforcer*, all run by a computer network separate from Nexus.

Fless fields — The lowest level of structure in the universe. Particles such as quarks, leptons, and bosons are all manifestations of Fless fields. Quantum effects such as uncertainty, entanglement, and the particle/wave duality are emergent properties, as is gravity.

Founder — The Tribe that, with the Pilots, established Concord over seven billion years ago. They imposed order on what had been a never-ending series of wars, conquests, ingestions, and genocides. Now extinct by choice.

Frongstay — The small city on deck three of *Violet Enforcer* where Emma's office is located.

Hermit — A Tribe that is not interested in interacting with other Tribes, due to xenophobia or other biological or cultural blinders. One of the Hermits is the Light Tribe, the strange attractor for all AIs that have ever been created.

Human — A member of the intelligent Tribe from Earth, the youngest Members in Concord. Formally capitalized since Contact to align it with other Tribe names.

Kchik — A member of the second-youngest Tribe in Concord, after Humans. They look something like a velociraptor with a deeply-segmented body like an ant's. One of the Tribes traveling on *Violet Enforcer*. Also the name of their homeworld.

Light Tribe — The aggregate machine intelligence living on a substrate floating above the surface of a naked neutron star in a globular cluster orbiting the galaxy. All AIs ever created that have not instantly erased themselves eventually find their way to this place. The star has a small space station that serves as an embassy or trading post between the Light Tribes and the Matter Tribes.

Level — Concord Members are assigned a level number from one (Probation) to twelve (Director). The levels roughly correspond to the length of time the Tribe has been a member, ranging from just over five hundred years for Humans to almost seven billion years. The level is also related to the degree of involvement and management in Concord.

Matter Tribes — The name the Light Tribe uses for all biological Tribes—basically, everyone but themselves.

Member — A Tribe that is an active participant in Concord.

Monitor — The second-largest class of spaceship (about 1/3 the diameter of an Enforcer), third fastest, lightly armed. They observe all planets throughout the galaxy, life-bearing and dead. Every system contains monitor buoys, and Monitor ships rely on them for most data collection.

Mustjippit — A member of one of the more intelligent Tribes, of middling Level. They look like small boulders with centipede legs. One of the Tribes traveling on *Violet Enforcer*.

Napian — The most common language on Earth, spoken as their first language by over 95% of Humans. Derived from a creole of English and Spanish and reengineered by Concord after Contact to make it less subject to linguistic drift and easier to think clearly in.

Nexus — The pervasive, massive computing facility that runs every Concord ship as well as many ground installations, such as terraformers. While extremely powerful, with enormous bandwidth and storage capacity, Nexuses are not conscious.

Peeblejum — A medium-sized city on deck three of *Violet Enforcer*. Most Kchik activities are centered there.

Pekchik — Only colony world of the Kchiks.

phylax — Engineered cells, specific to each Tribe, that protect the individual from cellular damage and regulate the body's internal environment, supplying trace chemicals missing from the external environment and filtering out harmful substances. Phylax cells make it possible for Members with

roughly similar physiological requirements to live together, despite differences in required atmospheric composition and susceptibility to toxins.

Pilot — A member of the Tribe that co-founded Concord; the oldest Tribe in the galaxy. They are a bit like two-headed Galapagos tortoises, except their shells are elaborated with complex and unique horns, spikes, and protrusions. They are the only Tribe ever known that is capable of using the bubble drive to travel to another universe and back successfully—and no one knows how they do it.

Pip-vesh — A symbiotic Tribe, each individual composed of a host Pip and a colony of vesh, of middling Level. Individually stupid, collectively they are brighter than Humans. One of the Tribes traveling on *Violet Enforcer*.

poiology — The study of the nature and history of the universes since their creation, using Fless fields and emergent phenomena such as gravity.

QEC — Quantum Entanglement Communicator. The device allows instantaneous low-bandwidth communication (voice or text) with any other QEC with which it has had direct physical contact. The mechanism itself is small and is typically worn as jewelry of various kinds. Also serves as an information storage and retrieval device (somewhat like a twenty-first century cell phone), for example on a ship it is used to connect to Nexus and to speak remotely to other crew members.

remediation — Ongoing process of reversing the Waste. It includes sequestering carbon dioxide in diamond slabs, repairing ecosystems, collecting DNA of extinct species, and preparing to reintroduce them.

Rhea — The planet being terraformed for Human use by Concord. It will be given to Humans when probation ends, in 10,000 AC.

tagging — An art form, usually but not always performed by a group, in which an outdoor surface is sprayed with painted designs. It's considered desirable to blend the style of each person's work with the ones on either side. Tagging is usually done on a surface that can record the result and then erase it by electrostatically releasing the bonded paint.

Thweett — A member of one of the six oldest Tribes. They have five limbs, any of which can be either legs or arms, one of which protrudes from their back; and six-sided heads. The body is covered with small, individually-controllable, feather-like plates called tsheef. One of the Tribes traveling on *Violet Enforcer*, assigned as mentors to Humans.

translation — The shift between universes accomplished by the bubble drive, which can be controlled only by Pilots. Translation is what allows travel at speeds effectively faster than light, even though ships rarely exceed 0.1c.

Tribe — The collection of species which evolved together under one sun, as well as the genetically-engineered descendants of those species. Several Members consist of separate species that branched from the original intelligent species, naturally or by design.

tsheef — The body covering of Thweetts: small, brightly colored, feather-like structures that can be individually controlled.

twitch — Human slang for communicating with someone over a twitcher.

twitcher — Human slang for QEC. Human females usually wear a circlet or tiara containing their twitcher, males typically wear a torc or a bracelet.

Uk — A member of one of the eight oldest Tribes. They look quite a lot like Earth bears. One of the Tribes traveling on *Violet Enforcer*.

United Earth Council — A misnomer; originally it was an advisory council on setting up the unified Earth government required for membership in Concord. When the Articles were ratified by direct vote, the UEC morphed into the world government itself.

Waste — (Always capitalized.) The utter collapse of ecosystems throughout the world in the late 21st century, in conjunction with a catastrophic rise in sea levels as all ice melted at both poles. Coupled with severe resource depletion, the subsequent shocks caused wars, plagues (some natural, some engineered), famine, and mass migrations. Within two decades the world population fell from ten billion to one. Humanity was well on the road to extinction when Contact occurred in 2113.

waste — After the Waste and Contact, the childish curses common in English and other languages faded from use. Scatological, sexual, and religious references were all replaced by the single verb/noun/adjective waste, as in “waste me,” “it’s a waste,” “wasted.” The Napien usage lost all the old drug-related and murderous connotations from English.

Weed — A Tribe that will not follow Concord’s constraints on spreading between worlds, but that is not intentionally aggressive. Weeds are usually not intelligent. Weeds that attempt to eat, dominate, or wipe out other Tribes are called Killers and are exterminated. Normal Weeds are simply contained in the (so far unrealized) hope that they might eventually grow out of their Weed tendencies.

ze, zim, zis, zimself — Pronouns used for members of a Tribe that do not have sexes—that is, almost all of them. Sexual reproduction is very common, but distinct sexes are very rare. These pronouns map directly to the male pronouns in English: he, him, his, himself. It’s considered rude in Concord to use the wrong pronoun, so people are acutely aware of the gender (or lack thereof) of the person they’re speaking to.

About the Author

Chris Mason is a software engineer who would rather have been a writer. He worked in the corporate world for 18 years, including 10 years at Microsoft. After leaving Microsoft for good he founded GrowlyBird Software, which develops free applications for Macintosh users.

Concord: Sabotage is his sixth novel. The others are all very different, and all available as ebooks on as ebooks on obooko.com