Under the Ice

It had been her suggestion, her invention, and most importantly, she was the only one who would fly it. More aptly, she was the only one who would sink it. So it made perfect sense to her and to all who knew her that she was in command of the first landing party on a planet thick with miles of ice. Her mother didn’t understand why she would volunteer for a one-way trip with no guarantee of success, but that’s how mothers are. She recounted her conversation with her mum in her head as she switched to firing the thrusters to break her descent.

“Well, it’s a crazy dream. I’m sorry honey, but someone has to consider your safety, since you clearly won’t.”

She pulsed and tickled the thrusters under her trigger finger. Confirmation of her initial approach, which she sent about an hour ago, came over her headset, small and tinny. The distant voice reminded her of her Gramm, who used to shout more loudly into the phone if she was calling from Florida than if she was in Massachusetts, regardless of the quality of the connection. She smiled at the thought of the little wrinkly woman shouting into a headset in Houston surrounded by many serious men in white coats. She gave the ship one last long burst and felt her descent stop, followed by a watery *schlopp*.

This was the moment that required her expertise. She had designed the ship to gather solar energy over the entire trip to be released as thermal energy at the base of the ship once she landed and then switch on the nuclear generator only once the entire ship was enveloped in ice. Her job was to guide the hot drop-shaped-can through the ice like a skipping stone lilts into a pond. The trip was not as easy as a straight drop, so unlike most astronauts who relaxed into their post-touchdown routine, she tensed up, scanned the panoply of displays and then *unfocused* so she could take in everything.

Sonar confirmed that she had miles of ice ahead – or below her, and charted various rocky inclusions directly beneath her that she would steer around by controlling the heat distribution on the bottom of her ship. There was no time to lose, she had to take advantage of the initial melt caused by her landing or the ship might lose its orientation or the advantage of liquid water to aid the melting. This meant that she might be several feet stuck inside Europa before she could confirm that the material beneath the ice, her target, was water and not slush. Water was a destination, it held adventure, life, and more questions. Slush did not hold any of the mystery that haunted her, slush was just slush.

Alexandra DuPont, the first solo flight female astronaut, chanced a glance out her single porthole view. The landscape was stunning in its austerity. A haze hung over the landscape, too thin to be considered an atmosphere, just the quantum fluctuations of water between an icy and gaseous phase, she thought, while strips of rust-stained blue and white ice stretched as flat as an Iowa corn field until they disappeared into the horizon. The strips nestled against each other in a set of ridges about half a mile to either side of her position, framing her final view like the edges of a wide road through white chocolate plains. The tundra of Northern Canada is oppressive because the sky is so washed out and overcast that the horizon is sometimes lost completely. Even though this was an icy wasteland, it was as though all the colors of the sky were instead locked in the surface below her, made all the brighter as they raced to meet the blackness of space ahead. To the side, if she pressed her helmet to the glass, an enormous Jupiter rising reminded all who weren’t already convinced, with its grandeur and swirling hues, that this was another world among many.

The on-board secretary broke the silence by reminding her: *One Fish, what’s your status?* Alex smiled to hear the name-scheme she selected – to many professionals’ chagrin – as she pulled the camera from its compartment on the dashboard and took some of her own photos out the porthole.

“Landing complete and successful, beginning descent. I’m sending you some photos. By the time you get this, I will be half dug-in. What a view, you guys, what a view!” She got back to work while most of the flashing screens in front of her were busy sending information back to Earth, a 35 minute journey, meaning she was truly on her own for everything. Of course she knew this, as did the panel of psychologists she had to please to be cleared for this trip. But she never really understood that she would be alone in all of her experiences until she first heard that long radio silence after her words while the transmission traveled a billion miles to home. There would be no help, no sharing in excitement or trepidation. No useful information in a timely way. She wasn’t even sure if her communications would make it through six miles of ice to the relay left behind on the surface. She liked depending on herself, but this was heavier than she knew it would be. And weighing on her the most was determining what was at the bottom of the tube she was carving.

“And what happens if you get partway encased in ice and find out that there isn’t water underneath where you landed? Then what do you do? Do you just wait for a rescue mission three years later? Could they even rescue you? You have so much potential to share, and it could end up frozen in a can a mile under the ice. I love you, honey, but it is insane.”

Still, it was her design, the ESA team asked how she could possibly have a bid that was a fifth the cost of other manned mission bids. If she hadn’t had the German Representative’s support, they’d have laughed her out of the conference room. Or they’d never have let her in – obviously this little girl doesn’t know the real costs of space flight. She let them lead with the question she anticipated for weeks in preparing her presentation – it was the Swede, “How do you expect to get a manned mission to Jupiter and back on so little?” She was tempted to mention that if they’d ever *read* the reports prepared for them, they wouldn’t need to ask. She toned the snarky down a little, but just a little, “Because I’m not coming back. This is a one-way trip. Sir.”

Just over an hour later, the ice was flush with the bottom of her porthole when the radio erupted in celebration of her landing. She, however, was in a different mood. She thought, *Why couldn’t I have designed this ship so that the psychological impact of being encased in ice would happen* ***after*** *I heard confirmation of water? Note to self, next time I design a can to melt through miles of ice after a 5 year one-way trip to another planet…* She sent another message, “I’m at lights out, visual confirmation that landing truss and relay is left behind and in tact. Deploying tether. Beginning a 5 degree pitch in my descent…” She continued her scientific babble. The jargon disconnected her actions from her deepest thoughts, which, despite her brave face, were best framed by her mother’s worry.

Elbows vs. Armpits

Timory occupied the chaise lounger cross-legged, tailor-fashion, with arms akimbo. ‘Occupied’ in the same sense that a foreign entity takes over a part of a nation and refuses to cooperate. Timo had made herself as pointy and non-conducive to comfort as she could possibly be. She also had staked out the chaise as the least suggestive of multiple occupants of all of the furniture in the DuPont Pre-Natal Residence Resort. She resisted ‘attending’ the dorm for as long as was allowed and only came when she was comfortably ‘escorted’ away from her work.

There were two reasons she detested this place. One was obvious in her posture and wicked stares, threatening any Ocean-goddess to dare to come and try, just try to pet her hair or god-forbid – spoon. Of course Timo knew about the clinical studies that supported close knit birthing teams, but she detested the casual and non-committal contact and the vapid cooing and banal banter that made up the team-ship. She preferred the cold reality of the ones and zeroes of her work. True. False. None. She preferred the rational responses and trouble shooting until a solution emerged. She even preferred the theoretical and – in her opinion – nonsensical responses of a potential quantum computer that her partner had been working on, which would push previously rational responses into the irrational and probabilistic foam of quantum mechanics. There it was, she preferred irrational computers to this. She said it to herself, “I prefer irrational computers.” Not knowing she actually said it out loud. It sounded strange as a lone statement, divorced from any context. She had to laugh, also out loud. But quickly resumed her redoubt of icy glares, lest she invite any unwanted approach.

The second reason she detested the Du-Pont Pre-Natal Residence Resort, was that there was nothing to do. Actually, the point was to do nothing – nothing that might risk her pregnancy, like over-exercise, over-eat, over-work, or any other overs that she loved and frequently administered to keep her sane. She had said goodbye to her partner ages and ages ago and was not willing to dwell on her loss, she also wasn’t about to be overly hopeful about her future with her partner’s daughter. She was happy to have preserved her brilliant DNA. She realized she was dwelling on Candace after all. Crap.

The second reason she detested the Du-Pont clan and all that bore its name was because there was no work to do. Timo thought about how close she had been when they forced her to take her leave – and here there wasn’t even a pad of paper. She tried scratching notes on napkins with her eye-liner, but it was no use, the napkins were cleaned out of her clothes during the day and she really needed to be in her lab anyway. It had been a week. Week fourteen, for those who count, which seemed to be the most interesting ice-breaker these umbilical-ized undead could muster. It had been a week and Timo was losing her grip. Maybe that was the first stage of the lobotomy these fluffing dullards had undergone – then it hit her.

In the midst of nothing, save for her perpetual stare-down procedure, Timo had an epiphany. In her labs, she had been working with an algae, trying to get it to respond like a semi-conductor, and she had success, major success – her science team was giving her better time in better labs and more lab assistants. But she had known there was a problem. And just now, while watching the baleen beauties bonding by braiding each other’s hair, *blech* – she had solved it. No lab, no assistants, no processor time, just her brain fighting the impending coma. Hers was not the first mind to benefit from time away from a consuming task. In the depths of chaos there is beauty. Timo would later say it was like finding your keys when you are looking for the ketchup, but it was not like that at all. It may have been more like running through Athens naked shouting *Eureka!*, but Timo didn’t pay much attention in second grade.

She looked around the rec. hall, this time not as a detester of all things pleasant and comforting. This time, she surveyed the landscape as a POW might survey the enemy’s encampment in which she was trapped. How could she get her message out? She had to try, because if she could get her message out, maybe *she* could get out. There must be a terminal she could access unsupervised. They wouldn’t let her use it if they knew she was working – *too stressful* they would blither. Some people were meant for this life, and some people were – well – not.

That evening during yoga she enacted her stealth-mode. Which is quite a feat for a clumsy computer nerd – both yoga and stealth. She was halfway there, under the nurse’s desk, with the nurse’s terminal line open, and she poked her work line, then waited, nervously. She had some time, the yoga had started, and she had crept out, like a comical routine, prostrate in a kowtow of child’s pose and inching slowly away from the rest of the group. She had felt the need to roll out of sight and up into a mock gumshoe’s gun-readied pose like the detective movies they used to pick up from Earth. Instead, she humbly crawled to the nurse’s station and quietly closed the door. It was a matter of seconds to hack the nurse’s portable notepad and call up the terminal. Finally someone saw her poke and connected. Thankfully, it was Cassiopeia Hinter, who enjoyed Timo’s blunt and aggressive sarcasm and was sad to have her go, but wouldn’t admit it – Timo was sure, or at least she thought.

“What are you doing? They’ll restrict your comm if you keep poking work.” Cassie jibed, even though this was Timo’s first attempt, of course.

“Yeah, yeah, nice to see you too, the seas are nice over here, blah blah. I figured it out.”

“Figured what out, you already figured it out. Thanks to you, we’ve been growing processors for two-weeks. Never mind any of our own projects…”

“Yeah, thanks for that, but I don’t think that’s how we should be doing this.”

“Maybe I am glad you called.” Cassie looked serious for the first time in the comm.

Timo sucked in a breath to lay it all out, “So we figured out that the cells can work just like semi-conductors, like the silicon revolution all over again, especially since silicon is so hard to come by here, but it had required dual stimulation – we had to send two signals to the same cell: one to activate the cell and the other as the bit. That works great when you can hook up to that cell – but we need to be more flexible. We need to be able to send both signals into an organic network of the cells, like an algal colony, and have them both arrive at the intended cell to do their work at the same time. We can’t do that – just think of the last time we tried to meet for lunch. Even the most structured system has obstacles, and if that system weren’t structured…”

“You mean if it were an organic network of algae in a colony? Without our metallic interface connecting the different parts we’ve grown? That we’ve been working tirelessly, per your instructions to grow?”

“Exactly.” She paused and assessed the sarcasm in Cassie’s response, “Are you patronizing me? I’m about to be brilliant here, this isn’t any ‘Mommy Brain’ nonsense.”

“Fine, go on.” Cassie did actually appreciate Timo’s brusque manner and dark sarcasm, but only because she possessed such tremendous capability to see the big picture solutions. Generally she loathed sarcasm, but on Timory, with her dark curly hair and wiry little toughness, it seemed to fit.

Excitement teemed in her voice as Timo described how to transform any colony of the semi-conducting algae into a computer network capable of carrying out any feat of programming in real time without the assistance Cassie had been building for over a week. “We take the electrical stimulation pulse and embed it in the stream of the program, which would require a new programming language, but we’ve invented those all the time. The stimulating pulse is housed in the phase of the bit pulse, so that it interacts with the part of the electrical impulse that is the information as either reinforcing it, like two waves that add, or cancelling it, like noise reducers, which actually make more noise in order-”

“I know how they work, I took basic physics.” Cassie cut in.

Timory continued, “So we interface with about one thousand existing cells that are already networked and-”

“Already networked? We haven’t grown anything that complex yet, it’s only been about a week!”

“Yes, already networked, but not by us, or by you, but already there, out there, under the ice.” She paused to let this sink in.

“Are you suggesting that instead of harvesting the individual cells for building new circuits for computers, we –

Timo couldn’t let someone else be the one to say it first, “We harness the existing networks of algae colonies as our computers and develop an interface to use them in situ, on sight, undisturbed.”

Cassie rolled her eyes at Timo’s arrogance, “I know what in situ means. I was just reacting to the whole idea. It is… unbelievable. How can we do it, though, do you already have the language? Because I don’t think we can get it from you there.”

“Get me out.” It was half plea, half demand. “I know exactly what we need, I have most of it worked out in my head. Poke Athena on this and get me out.”

“I’ll see what I can do.”

Cassie terminated the comm. Timo promptly moved a relic of their conversation to her cloud drive and stashed it there before putting the notepad back on top of the desk she was hiding under. She didn’t figure Cassie as the kind of woman to steal her idea, but she didn’t know that she herself wouldn’t consider it, and who knew what other women would have to be brought in on the idea, maybe someone like her. Not to mention the work to get her out – it might be easier just to cut her out of the project than to have to get the city council or worse, a parliamentary excusal from residency. It might be, after all, *in everybody’s best interest*. She wasn’t going to lie down for that, so she filed away some ammo and slid back into yoga, in full sight of the nurse leading the women as they wove their arms up in impossible twists in front of their noses so that everywhere Timo looked, she saw armpits. *Thank the Universe I am outta here*, she thought. The nurse fired off a look that queried, *where were you?* A shoulder shrug, grimace, and brow movement said back to the nurse, “What *you* gonna do?”

Thank the Universe I’m Brilliant

Timo sat bolt upright in her bed. Sweat pored off her heaving form as she tried to put the pieces together in her sleep-set-state. For the moment, she had no idea where she was, why a torrent of sweat poured from her pores, or why she was sitting bolt-upright in bed, for that matter. The confusing blankness of having no recollection of her night terror or perhaps pleasant or even very pleasant dream that made her sweat so much fell behind as she satisfied her body’s needs. She shifted from the bed to the commode, a process that took about 8 inches of sliding and little effort, then leaned into the sink and pumped water over her face and neck. It was dangerous to try to stand in the tiny cabins in the submersibles, especially in the dark. She was lucky to have remembered where she was – maybe. Although the night terrors had become so regular that she wasn’t even thinking. This was just part of her night time routine: eat a rations pack, exercise, throw-up the rations pack, sleep, freak-out, stare in the mirror at her panting sweaty, scared, torn-from-sleep pregnancy-changing face, go back to bed, not sleep, write, go back to bed, sleep not enough, wake up to the auto-timed lights throughout the ship feigning a morning light that no woman alive under the ice, at least that Timo knew, had ever actually seen for real. Was she lucky to remember where she was?

She flipped open her notebook and began to write. As she tried to record her sense of fear and panic and tried to find the source of it, the notebook suggested words for her. She flicked them away with a flip of her stylus, they were like so many of the supposedly helpful bits of detritus and slag that littered the path before her. Timo wondered if there was even a path. Working on location had its perks, at least she could avoid the constant medical prodding and plotting that pregnant residents had to submit to. She knew what she was getting into and yet she still found it repulsive. So many women were always interacting with her body and *constantly* giving her advice. Timo shuddered with just the thought of all her expecting so-called sisters back in residence. Their cloying touches and constant petting was sickening. Enough was happening to her body that she didn’t want to have to tolerate another level of repulsive biological interaction, even if the doctors said it increased success rate of coming all the way to term. She needed to work. She would have been the donor, not the receiver if it hadn’t been for her partner’s illness. Damn her! No, not damn her, she was a sweet and gentle woman and her DNA is growing a baby inside me, thought Timo. But she could damn her a little, she supposed, for the whole official pregnancy-residency piece. Timo remembered where the submersible was anchored and thought, *Thank the Universe I’m brilliant, or this escape would never have happened*. Timo revised that thought, if she were actually brilliant, she would never have put herself in this position in the first place.

As the auto-light came up, Timo was already bustling about her tiny compartment, excitement teeming. They had been stationed in view of one of the most cohesive and expansive algae colonies under the ice. But she didn’t get very excited about algae. Timo was a computer nerd. She liked faster, smarter, sleeker, not squishy or gooey. Although, this algae was not gooey at all, its cells were more like extended pods with a single filament stretching in each direction. The middle part lit up when stimulated by a certain chemical. The first settlers had enjoyed the displays they put out during a high-nutrient cycle in the upwelling warmer waters. Not-as-cold waters would be a better description.

“Are we ready?” Timo asked her compatriots as they assembled in the tiny view room in their tiny can.

“We finished connecting the network last night, although we had to scare off a big harvester, probably attracted to our lights. We made some noise and it swam away. I was waving and pinging at it and Callie was clanging her tools together, it was a racket, I’m surprised you could sleep! I was shouting through my helmet, like, ‘Whoooooot whoooooooooot! Not here, fatty, try another scum field, stupid sea cow!’ Hooting and whistling and poor thing, it probably thought it was going to eat like a queen! Like a fat slimy queen.” Ariadne was Timo’s engineer on the team, seeing as she was also a botanist, she was the best selection for the mission, although Timo could easily do without her bravado and her tendency to vocalize every thought. Timo wondered if the doctor’s scans had let some autism go unreported in her screenings to be on the team, since she clearly wasn’t picking up on the social cues Timo was trying to give off right now.

“Yes, and she said all of that with her radio on. Surprisingly, I can inform you, I can still hear. Although, it was pretty big.” Callie added. Callie did pick up on Timo’s apprehension this morning and took over the report. *Good ol’ Callie,* thought Timo. “We set the network but didn’t want to test it until you were up. Is your initializing code set?”

Timo nodded, “Any idea how far this colony goes?”

Callie responded quickly enough to cut Ariadne out, “We saw some glow pretty far off, but we’ll find out soon enough, right?”

Ariadne interjected anyway, “Should we say or do anything before you push the button, T? I mean any ceremony or wise words or song -”

Timo smirked, winked and pressed enter on her comm. The wall of algae that stretched out before them into the darkness beyond lit up in undulating and radiating concentric waves emanating from where they had wired the ship to the colony. They trio watched as the glow shot swiftly across the surface above them and away into the dark.

“We knew they were conductive, but that was *fast!*” Timo remarked. Surprisingly, Ariadne had nothing to say. A moment later, more fractured and random ripples came echoing back to the ship. Timo hooted, she was not a hooting girl, that was a display left for Ariadne, so this caught the other two by complete surprise. “Wrap your heads around this, there’s a complete network of over 750 quadrillion independent semi-conductors in this colony alone! And they just processed a ping in under a second! Let’s try some more complex code, see what it can do.”

“Have at it, we’re spent.” Callie pulled Ariadne by the elbow away from the stunning display of undulating glow out the foredeck window. “Good luck,” she added.

Timo thought, yay, sister, I will have at it. It was all going so smoothly. This could revolutionize computing for the entire world. Worlds! Maybe it would even give them a leg up in their constant bickering with all the different factions on Earth. She was so excited and was getting the responses she predicted as she pushed more and more complex code through the network, making it into so much more than a biological Turing machine. DuPont center for dazed boredom came suddenly to mind and she realized that she needed to make this station last another few months. So maybe some problems would be necessary anyway.

In a hazy fog, Timo is in and out of lucidity… dreamscape

As Cassie moved through the ship, she remembered her childhood experiences in big spaces. Thoughts like these comforted her. She was not short, and moving around in a compact space like her quarters, or through the bulkheads from hold to hold or chamber to chamber, whatever they were called – required ducking and stepping over a lip at the same time. She was surprised she didn’t hit her head more often. Cassie had started diving at a very young age. She liked staring out into the darkness as the city’s lights faded into clear cold depths. The occasional flash, from algae or some other bioluminescence, confirmed her imagination’s sense of the immense scope of the abyss. She didn’t mind the cap overhead. Not many divers did. Most divers never trained in an open water system, so they never felt trapped in the cold. Once in school, she had been a part of a trip to the surface. None of her class got to leave the elevator, but they did get to gaze out into the depths of space. That moment was impressed upon her and she relived it every dive. Except that the dives were different, there was life in here, amazing life. Especially where the city was, in the upstream of an upwelling, the heated water miles below rose with all the life that it tore from the hot rocks and flowed to the underside of the ice, where it spread out like a flower and dumped a wealth of nutrition for all kinds of odd creatures to consume as it sank to the same depths.

She had catalogued many different creatures, but she had not spent much time this far away from the noise and lights of the settlement. Every dive was an opportunity she eagerly awaited. Maybe she should have been a biologist, she thought this often, but the assessments had suggested engineering. She often wondered if there was just a shortage of engineers that year. She came through a bulkhead and heard part of a conversation, not between Ariadne and Timo, so she stopped.

Someone important sounding and somehow familiar was saying over the terminal, “You shouldn’t have let her go, claim *best interest* and move on with it. She is a risk, her type should not be allowed to be impregnated in the first place, that is why we have the vessel caste, so that women like us can return to what we truly love, [insert diabolical cynicism] our service to the colony.”

An even more familiar voice responded from in the cabin, “If you think we have anyone else in the entire settlement capable of what she is attempting to pull off, you are greatly mistaken. She has no equal. We need her on sight, making this happen.”

The comm speakers droned on and Cassie tried to place the voice on the notepad. “And if we have another situation? What if her daughter has the genetic defect – it is still as high as 40% likely. At 13 weeks, we can do something about it, the psychological impact on the mother is less dramatic than once she is showing and grows more attached to her daughter. With this assignment, she will be in transition while well out of reach.”

In the room, she heard, “Don’t worry, we have her monitored very closely, and we will be able to determine the daughter’s status very soon.” That made Cassie wonder, there wasn’t a doctor or medical supplies on board, how? And who is we?

“The security of this settlement depends on us doing what is in everyone’s best interest on this, we cannot allow the defect to surface again.”

Cassie blanched when she heard the voice in the room say, “If it has to come to it, hormone treatment or an accommodating circumstance can be arranged, this work is far too important to disregard. We may have Earth poking us for favors and processor time after this.”

“Accommodating circumstance, hmmph.” Pause. “I need to hear daily, if this daughter possesses the faulty chromosome, I need to know immediately.”

“Of course. Ma’am, other councilwomen have shown concern for the situation as well. Granted, not with the same shrewd intelligence, mostly that the pregnant one is stressing her body and jeopardizing an important daughter. What should I tell them?”

“You’ll figure it out.”

Cassie realized recognized both voices; one was a council member who she sometimes heard on Europa-wide addresses or news reports, the name would come to her. The other was someone much more familiar, well at least the voice was familiar, but not how it spoke. She also realized she was in big trouble. Something was very wrong here. Not just the information she had just heard, but that there was a duplicitous spy on her tiny team. Cassie carefully backed up as quietly as she could, taking soft backward steps, rolling from the outside of her foot to her whole sole then carefully silently rocking onto the other foot, until her watch made a single metallic clink on the hall hatch. She thought she was out of obvious eavesdropping range, panicked, she covered her mouth to make it sound even farther away and called out, “Ariadne, you up?” She waited a beat, then walked briskly into her compartment. “Come on, we’ve got to get a move on for checking the network and scaring off any more harvesters!” Cassie’s enthusiasm would probably give her away – was it too much? Crap, now she was going to be second-guessing every interaction. It was only a matter of time.

Since Cassie was now watching for it, she saw Ariadne transform. Her narrowed, shrewd, power hungry eyes widened and her tight mouth slackened nearly imperceptibly. “Hiya! I was just checking in my rations for another honey oat bar. Okay, I was actually looking in tomorrow’s rations, but I like them. I like honey. Have you ever seen the bees? I went to the farm pod when I was in school, I thought it was what I wanted to do, farming, but the assessments suggested engineering and who was I to argue with a test? How long were you waiting?”

Smooth. Cassie was almost caught off guard by her teammate’s casual tone after basically offering to kill her pregnant boss, but she had been formulating her response, “I just got here, why?” She waited, practicing her own blank look. She could sense the inner shrewd woman, behind the talkative open façade, scanning her for signs of espionage.

“No reason. Just let me shut it down in here. I’m always trying to do my part! The thermal upwelling only lasts for so long, you know!” It was uncanny, it was almost as if a different person was hiding inside her co-worker. Or her co-worker was just a suit that could be stepped into and zipped up the back.

They put on their suits with the usual one-sided banter. Cassie relied on her taciturn reputation to think a bit about the conversation she had overheard. If she could somehow let Timo know, then there would be two against one and Timo could probably get an archived recording of the comm transmission off of Ariadne’s terminal. Well, if anyone could, it was Timo.

“How big do you think harvesters get? I mean that one last night was huge.” Ariadne dragged out the word huge so it sounded as long as the harvester. Cassie forced a laugh, which wasn’t that hard, there were so many old Ariadne traits that she could fool herself from moment to moment. “Or is there a limit to their growth, like the amount of algae, or other resource limitations, maybe they also eat raw nutrients and the algae is just a treat? You’d think if they only ate the algae that they would have evolved to hang out on the algae instead of swimming around like enormous kites. Do you think they look like kites? Or maybe wings, like a skate or ray in the oceanography files from Earth. Ah!” Ari gasped. Cassie looked over – which wasn’t easy since she already had her rubber liner and heavy helmet on – but she looked over anyway, only to find nothing wrong at all. Ari looked at her and said, “Do you think there is anything that eats harvesters? I mean that we haven’t found yet?”

Cassie was annoyed to have to keep up the act of being annoyed, which actually didn’t make it easier, since now she was annoyed and terrified as well, “If there was, we’d have seen it on our scans. We scanned for heat, topo, motion, there’s nothing bigger than a harvester all the way down.”

“Until you get to the vents! Wow, I’d like to get to go down there!” Ari put on a dream like face as she pulled her helmet over her head, then continued with her biological assessment of the planet.

*Damn*, thought Cassie. She had hoped to get to radio Timo before Ariadne got her mic and receiver ready. So much for her first plan. Cassie wondered for a moment if the constant faffment was on purpose, to keep her from being able to do anything other than pay attention to Ariadne. She realized it did give Ari the freedom to keep looking at her, watch her, the whole time she blathered on. As they stepped into the airlock, Cassie realized that maybe this woman wasn’t just a co-worker who was betraying Timo, for whatever reason, it struck her that this was a professional, working them over. She felt bile rise up in her esophagus, like she was going to be sick in her helmet.

Cassie swallowed the acidic reflux that surged into her mouth and steadied herself. “Ari, are you reading me?”

“Loud and clear! Me?”

“Loud and clear. Timo are you reading me?” There was a long pause, which Ari was about to step back into when Timo crackled into existence in Cassie’s ear. “I hear you, Cassie. Are you about to head out?”

Ari chimed in, awfully chipper for a deadly spy-person, “Yeah, we’ll be expanding the network interface like you asked and scaring off anything that wants to eat your new computer.” She laughed at her own joke.

Cassie said, “you should have a visual on us in a few minutes, we’ll be just above the ship.”

Timo responded, “I’ll be here, I might even wave.” Then added, “Good luck.”

Ariadne dialed the bulkhead door closed, typed in the security code for the airlock and turned to Cassie, “Ready?” The dual-control safety feature on the airlock required them to press the final button at the same time, at either ends of the compartment. “3, 2, 1, Go!” A buzzer sounded and cold water started to pour into the chamber through grates in the floor. The room filled quickly, both women going through a series of seemingly coordinated diagnostics as they became submerged. Cassie was happy to share the weight of her massive suit with the ocean. When the room was full of water, Ariadne asked, “All set?” Cassie gave the thumbs up. Ari cut the lights, both women flicked the lights on their helmets. She cranked open the door and they both reached down to their waists and adjusted a control valve that bled small amounts of their air into a bladder mounted on the back of the suit until they became weightless, hovering in a gaping doorway in the side of a submersible ship anchored to the underside of what looked like furry ice. The underside of the ice was irregular with massive walls jutting down for hundreds of feet at a time, like an inverted mountain, mirroring the seismically torn landscape miles and miles below. Sometimes there were caves, but mostly just stalactites adorned the rugged underside, the entirety of it covered in a dark and slick film. Luminescence ricocheted about the fuzz on the ice. Some of it was random, while most of it radiated from the first interface they had built. A series of conduit emanating from the ship spilled wires over the nearby wall to which the ship was anchored. On the other side of the ship, where the women stood in the gaping door for a moment, there was nothing. The wall ascended and continued then planed out into the darkness. The subtle glow of the ship’s light pollution penetrated far into the clear cold water, occasionally reflecting off of some dislodged fleck of algae or distant lonely harvester skate, reminding the visitors just how expansive the sea was.

Cassie stepped into the abyss and floated gently away from the ship. Her hands swiveled her about and she turned to face the ship. After a quick visual inspection of the ship, she waved Ariadne to join her. Ari stepped out and pulled herself up toward the top of the ship with a tug on the door. The door stayed open for them as they moved toward their destination, sometimes gently waving their arms as if the heavy gloves and restrictive pressure suits let them swim. Mostly they pulled themselves along the ship, inspecting it as they went, and emitted little jets of water when they needed a little push. They could hear their own breathing amplified in the small space, but they emitted only the occasional bubble, as the suit worked to recycle the CO2 into oxygen and send it back into their system.

As they crawled over the top of their ship and started to come down the other side, Ariadne, who seemed like a pro at this and was grasping a ridge of raised rivet points to pull herself along, instead grasped at one of the ship’s antennae. Cassie tried to say something, but the only words that came in time were nonsense and by the time she even said those, the radio antenna was snapped. There was still plenty of power in the suits to communicate with each other and the receiver on the bridge, but simple communication to the city or long distances to the suits wouldn’t be happening without a work-around. “Oops. Good thing we’re working right next to the ship or we’d have a new job for today,” Ariadne said with too much optimism for Cassie to hold her above suspicion. Clearly it was on purpose. That kind of rookie mistake happened on the first dive on a project, not the tenth. And even though it did happen on occasion – Cassie even did the same thing, on her *first* assignment - she knew that it was no accident.

Cassie knew she had to reply, “What do you mean ‘we,’ that’s your afternoon welding project while I’m petting skates.” She accessed an outer panel in the ship and pulled out a rack of tools and equipment for their job.

“It’s no biggie, we all have comm’s in our quarters and we’re not going to use it for work, because we’ll always be right by the ship. I mean of course I’ll fix it later, I just thought it would support me, I mean I had no idea it was so fragile.” And Ariadne started a diatribe about the quality of workership that went into their equipment *these days*.

Cassie rolled out a panel, scored it, and pegged it to the ice right on top of some of the thick algae. She cut Ariadne off in the middle of her evaluation of whether there was any hope for those in manufacturing, “This stuff is hard to stay on, it’s really slick.”

“Sometimes you have to grab it like a rope,” said Ari. And the swath she held onto in her thick, gloved fingers lit up as she squeezed it.

“Except that that sets off the bioluminescence and we don’t need harvester skates or other little pests buzzing around here while we’re trying to get this done.” Cassie motioned to a small hand-sized harvester munching about ten yards away in the darkness. “I’m ready for you to snake the feed from the ship.” Ariadne hoisted a coil of wiring conduit, adjusted her buoyancy valve and pushed off the wall to landed gracefully on the side of the ship, attaching an end of the coil to an electrical casing just above the cockpit. She rapped on the viewport and waved in at Timo, who waved back without looking up, while typing furiously.

Ariadne turned and pushed off again, letting the coil unwrap as she returned. She presented the messy end, exploding with wires coated in all different striped patterns of insulation, some terminating in clips and plugs, others ending as bare wire. Cassie set to attaching it to the panel she had anchored earlier.

“Here comes a good sized one, you ever wonder what they taste like? The early settlers must have tried them, or do you think we’ve been vegetarians, if the curd counts as veggie, the whole time? Looks like something thinks they tastes good!” Cassie paused in her work. Ariadne continued, “There’s a parasite anchored on the belly, if that is the belly, you know, the lighter brown underside, the side opposite the mouth – there is a little eel there, I wonder if I can get it.”

The skate nibbled its way around them, secure that they were no more danger than the ice itself. Cassie heard Ariadne telecasting her every move as she tried to get a closer look at the parasite hooked onto the harvester. She got a hold of it, and it dislodged from the skate, twisted around to loop around Ariadne’s wrist, looking for soft tissue. Ariadne shrieked and let it go. Cassie stopped, “What are you doing!”

Timo buzzed into their ears, “Everything okay?”

“Yeah, but–” Ariadne started.

Cassie cut her off, “If you are going to scream, at least mute your radio.”

Ariadne came back in, “It’s on you, it’s biting your suit, it’s trying to bite into your buoyancy control bladder!”

Cassie seemed less alarmed than Ariadne, “Well, get it off,” she said.

They had Timo’s attention now and through the viewport, she saw one of them make a swift move and suddenly a stream of bubbles effervesced out of the bladder on the back of the other one’s suit. It was the one crouching, so she figured it was Cassie. “Cassie, you’re venting air, shut off your bouy valve.” She watched Cassie fumble around her waist and turn it off. The shimmering train of bubbles slowed to a stop. Cassie’s weight set in and she tried to scramble against the wall, then she tried to hold on to a rope of algae. As that tore from the ice, she reached for the conduit and slid to the middle of it. The ship shifted and Timo felt the tug on the line. Cassie now hung directly in front of the view port, filling most of it. Timo could clearly see the back of her suit and was surprised at the puncture in the bladder.

Cassie dialed up her jets and regained some of her buoyancy, but still kept a tight hold on the conduit running from the ship to the panel on the wall of ice. She knew that the panel was only held in by bolts screwed into the ice, not a very rigid attachment, and that the wiring was incomplete. She started a hand-over-hand motion to bring her over to the ship.

“Cassie! I can get you, stay where you are!” Ariadne said.

Cassie kept moving hand-over-hand away from Ariadne and toward the ship. The ship shifted as the weight increased. Ariadne had almost reached the ship as well; she reached out for Cassie. Suddenly, the line ripped from where it was secured above the viewport. A jolt of electricity arced between the ship and the two women’s suits as the line tore out its electrical casing. Cassie swung a slow pendular motion away from the ship and bumped hard into the wall. Ariadne seemed stunned, then waved her hands to turn herself around. Cassie slid along the line to the end of it and then, instead of grabbing hold of the end of it, she just disappeared into the dark below.

Timo could no longer see her because of the awkward angle on the viewport. She couldn’t believe it. She felt sick, gagged and then threw up in the cockpit. Ariadne watched as the lights on Cassie’s helmet got dimmer and dimmer in the dark depths below. She deflated her own bladder and disappeared from view.

Nearly twenty minutes later, Timo heard the clunk and clang of boots and suits in the airlock. She stood on the other side of the airlock door, pressing the intercom, asking repeatedly, “Is she there? Did you get her?” The intercom was not set to interact with the helmet radios so she had to wait for the water to be purged from the airlock. It was more awful than waiting for the last twenty minutes, unable to raise either of them on the radio and not knowing why.

The airlock opened and Ariadne stepped out, alone. Timo collapsed, sobbing. Ariadne sat in the hallway with her, the two women holding onto each other, not because they were close friends, but because Timo couldn’t understand that Cassie was just there and then just dropped. Only a minute passed by, but it was the first minute of a new dark light cast over Timo’s sense of self and purpose.

Ariadne said something about trying to get someone on the terminal and moved into her room. Timo stayed where she was, thinking through what she had just seen and the small bits of the conversation she had heard. Guilt poured through her – she hadn’t actually needed that expanded network, it was a diversionary technique, so she could stall and drag out their stay as long as she could and hopefully well past the twenty-week window. She had thought she could argue that she had made it over halfway, and that she would only be a disruptive influence on the DuPont system, she had been so selfish, she thought.

Then she realized, as she reviewed the last twenty-five minutes, that this sort of dive was child’s play for Cassie. There was no reason for any of that to have happened. She went back to the cockpit – now clean of her vomit, and reviewed the recording of the helmet radio conversation. She listened for a while to the bit about welding in the afternoon and wondered what could have happened. She rewound it again and heard it, a snap. That must have been the radio antennae going out, which explained why she couldn’t raise anyone in the city. They wouldn’t have been able to get here until now, but it would have been better than connecting by terminal to a civilian port or some other use and trying to get someone to poke the base command for her. She listened to Ariadne going on about the eel. Then she knew that something was afoul, the puncture on the bladder looked much more like the result of a torch or quick-solder or welder or other electric tool, but not a bite, not unless the eel had a scorching effect when it bit because there were burn marks circling the small hole when she saw it.

Ariadne came in, “It took a minute, but I was able to get someone on the terminal in my bunk. They are trying to raise her on their radio and they are sending a team to explore underneath us. She still has hours of air and that suit can withstand pressure on the sea floor. The only real concern is the cold. I don’t think the battery will hold up, especially if she is trying to use her jets. I dove after her, but I couldn’t see her lights anymore. I went as deep as I could and still see the ship. I looked all around and I didn’t see her lights anywhere.”

TImo thought about her own safety, “Is someone coming here?”

“I don’t know. I don’t know if they could dock with us.”

“Can the ship dive?”

“But your work-”

“Isn’t worth this.”

“Yes it is. We won’t be able to come back to the same exact spot, we will lose your interface, and your tests could actually be worth staying. Besides, I don’t think this ship would be any good in a search and rescue, just look at how much of the ocean you can actually see out that viewport, and this is the bridge! I don’t think it is the way to go. We might even hit her, this thing is so clumsy to drive.”

Timo realized that her rescue plan was a non-starter, considering that Ariadne was the only pilot left. Timo said, “I’ll be in my cabin.” And she left.

There were times in her childhood when she woke up in complete darkness and couldn’t tell whether her eyes were open or shut. There were dreams she had when she knew what was happening around her, but she, for some dream-reason, couldn’t open her eyes. She felt ensconced in the darkness of her dreams, the one so dark that she couldn’t tell whether she had actually opened her eyes. She couldn’t remember why she had been sleeping here. Then she recognized the feel of her suit, the slow response of the heavy limbs and the sound of her own breathing. She felt weightless, which was a different feeling than buoyant. When she was buoyant, the suit pressed against her, now it felt more like she hovered inside the suit, gently pressing against her chest and thighs. She extended one arm and pulled the other in and the slight pressure changed to her side, then her back. She remembered the shock and the fall and she opened her eyes. Her lights caught a glimmer of some flotsam that she zoomed by. She turned again to face the depths to which she was imminently penetrating. She was plunging deep and fast in total lonely darkness toward the bottom of the ocean and she was cold. Her lights penetrated a few hundred meters in any direction, but only reinforced the sense of overwhelming darkness abounding so she shut them off. She was sure her radio was still on.

“Timo, can you hear me? Ari? Anyone? Help, help, this is Cassiopeia Hinter and I am dropping very, very fast. Is anyone there?”

Empty waves. She tried inflating her BCB again. She did slow down, but bubbles came pouring out of her. It was no good. These suits didn’t rely on a reserve of compressed air, instead they counted on recycling a very finite amount of air through a number of different systems, including breathing, which she needed to stay alive, which seemed more important than floating.

Speaking of floating, Cassie noticed that the bubbles she let out acted very strangely. They were not circular, rising bubbles, instead, they were umbrella shaped and they wiggled out away from her sideways, in all directions. Cassie, the engineer, thought about what this meant. She felt the gentle pressure of her suit against her stomach. She realized that she may not be falling the direction she thought she was. She was caught in a down-draft, the opposite end of the cycle from the upwelling that bathed the city in nutrients and relative warmth. Of course, that made the enormous ice wall they had been working on make sense, she thought, oddly distracted in a geologist’s epiphany. She absolutely was falling, but without any reference, for she had mistaken the force of the down draft on her suit for gravity. She thought she was facing the depths when she was actually facing up and falling on her back. The inversion confused her and the disequilibrium that accompanied her mind adjusting to her new direction made her a little seasick in her tiny vessel. She gave her jets a burst, and tried migrating sideways, out of the down draft. She had visions of being swept to the bottom of the ocean. She could feel the pressure against her suit let up as she moved laterally. The tiny plankton and algae that was in front of her pleasantly let her fall past it at a very polite speed. Meanwhile, the torrent behind her, as she turned to look, seemed to pull nearby detritus into it like a vortex and speed by in an express trip to the sea floor.

She tried her radio again. Then she checked her battery: forty-five percent. She must have burnt a fair amount of battery running her lights for the job, and also during her fall when she was unconscious. The air recycling system didn’t need the battery, but was assisted by it so that breathing wasn’t such a lung-felt exertion. Between the radio, the lights, the air filter pump, the jets, and the heater, Cassie had to decide. Was this a wait as long as she could to be rescued kind of thing? Or did she have to get herself out? Or should she just enjoy the next few hours, because they would be her last.

She took some respite in knowing that the suits were the same ones issued to the women who had explored the sea floor, but they had had very infrequent dives on their trip. She hoped there wasn’t a difference between pressurizing at the top of the water lens and near the bottom in terms of the suit’s performance. The pressure, she had forgotten about that, she didn’t remember if the suit used battery to pressurize, or if it was the material’s rigidity. That would be bad.

“It’s just me and you,” she said to the suit. She chose to talk to the arms, the display on her left arm was like her suit’s face, her friend. “Do we stay warm or use the radio? We don’t need to be that warm.” She turned it down from 20°C to 15°C, then decided she could probably go a little further, and turned it down to 14, then 13. She stopped for a second and laughed at herself. Was she really going to be superstitious and not let it stay on 13? Of course. Every bit of luck counted in this situation, she knocked it down to 12, hoping that wouldn’t use too much battery for heat, since the water might only be 4 down here. She tried her lights again and peered into the darkness.

Think, Cassie, think. She thought of the time her sister’s friends had trapped her in the root keeper during a game of hide and seek gone wrong. The darkness was the same, but the danger wasn’t the same. Although, tell that to 8 year old me, she thought. She had yelled and pounded on the door, but it was no use, there was no one to hear. The darkness was non-negotiable, so she had had to get over her fear of it right then. For hours she waited, hoping someone would come along to get some potatoes or carrots, but she didn’t know if it might be days. The smell became comforting as she waited. After she settled her fear of monsters, she knew where she was and what was there with her in the pitch black because she could smell the scent of dirt-foam clinging to the food. She became cold and tired, she ate a carrot. It had probably only been four hours when she made the decision to grow up and get herself out of the keep.

She could keep broadcasting on the radio, but that would drain her battery. She watched the stream of nutrients in her light before she turned it off again. 43%. She thought about the enormous skate harvester and imagined it swooping down along the down draft to rescue her. Then riding a giant algae-eating winged creature to safety. It sounded like fantasy. How would she get one to come to her, anyway? They were drawn to lights. However, her light had been on during her unconscious descent, and that didn’t seem to surround her with eager algal fed taxis. Leaving her light on was the same as leaving her radio on, in terms of battery consumption, so it was no better a plan than broadcasting. It would just be broadcasting to a different species.

She decided to continue bursts of light and sparse radio calls for help. With her temperature down and the pressure increasing, she might run out of air first. She went into the diagnostic and switched off the air filter pump, just to see how hard it was to pull the air through the catalysts and filters unassisted. After three raspy breaths, she turned it back on. 42%. She calculated about five hours of battery, about how long the catalyst and filters could go without a lime rinse. So she would die on all accounts, except for pressure or something eating her, in five hours. What did that mean.

Oddly, Cassie did not panic. She was calm and sad, of course, but not hysterical. The soothing motion of the flotsam past her made it easier. This darkness had beauty and majesty to it. The dingy locker full of veggies was a very different envelope, woman made, artificial, expected. The door mechanism was a conquerable obstacle, which she conquered. Hmm, also in five hours, she realized.

She started to shiver. Shivering was a good thing, she had had breakfast, she’d be okay on energy, she thought. Was this kind of rationality shock, she wondered, or the onset of nitrogen narcosis?

Timo sat on her bunk. Ari had informed her that the base had sent a team below them, that they were not going to send a retrieval team unless Timo requested it. Why would I? She thought. She had responded to her captor like a willing abductee, remaining agreeable to get her to leave and feigning grief to get her space. Ari had played her part of victim to the accident and carrying on in the face of her own grief. Balancing the thought of a purposeful accident at the hands of her sole shipmate against the discomfort of growing into her largess in the company of cooing sycophants. *Hands down, I choose the murderer every time*, she thought. Rather than sadness, she sat in puzzlement. Stress inducing, fear laden, potential life-or-death puzzlement.

Timo thought through the potential denial she would face if she brought it up. Of course there was a possibility that the scorch marks on the back of Cassie’s suit, which she was sure caused the puncture, were accidental. Ari would say, “The parasite went for her suit and started to latch on somehow. I was worried about her, so I pulled the welder off my belt and zapped it, but I nicked her suit, too. I feel so guilty and awful, I hope they can get to her, it is so terrible, I just can’t imagine, I’m an idiot so I keep on talking and talking long after I’ve made my point,” or something like that.

But she didn’t buy that. She had seen Ari weld. She was fast and she was good. There was a reason she was on a team like this. *She could flame the mustaches off my mothers and not sear a lip*, thought Timo. She could have singed the spots off that thing in an instant and left no trace on Cassie’s suit. But there was no point bringing that up, either, she would claim stress of the moment or something. Timo pulled herself into one of the corners of her bed and pressed her feet against the front of her commode. She pulled her notepad to her and began to dig. She needed some evidence before it was too late.

It didn’t take very long. She found what she needed, along with some information that she was half expecting and at the same time dreading. She thought she ought to blame herself. She had taken the vitamins and supplements, but she hadn’t participated in all of the activities and exercises. To Timo, a scientist, most of them seemed like ritualistic spiritual drivel with no real mechanism for increasing success rates. She thought she had been a good mother, but here was this information on Ari’s clandestine transmissions to someone with very high security clearance back at the settlement. Her baby had a genetic deformity. Apparently, one of the chromosomes was incomplete, with her barely at 14 weeks, they certainly wouldn’t let her bring it to full term. Resources just couldn’t be spent, they would say that awful phrase, *not in everyone’s best interest*.

Her mind was completely off of Cassie now. Cassie’s death was sad and scary and created a callousness in her that she would wield like a blunt object. But this was bigger, it was a moment that defined who Timo was and how she would be that way. She knew they let women have babies like this on Earth, but Earth was in chaos and the ruling council would insist on using Earth as an example for why this specific deformity was so important to remove.

She read journal reports describing the nature of children with this deformity. They described the physical abnormalities and the mental disabilities that made her daughter’s birth untenable.

One summary she came upon on her terminal decried, ‘*Aggressive, destructive psychoses accompanied by uncontrolled impulsive and often dangerous behavior through at least the first 25 years of life, including sociopathic tendencies for mass destruction of peoples and ecosystems.’*  When she saw the clinical word for the children with this genetic deformity, she felt comforted instead of repulsed. It was so joyful, not repugnant. Her daughter would be a *boy*. She could deal with the reduced intelligence, the extra hair, the external genitalia, the greater strength and weaker will. This boy would be *My boy,* she thought.

Would birth be different? Would the gentle nature of her wife’s DNA make her baby less neurotic? Timo knew that this was a risk that could kill her, knowing nothing about giving birth, but she was going to have this baby *boy*. She could do it, she could escape the residency and find somewhere to hide. How, though? It didn’t matter, she simply had to, her womb was telling her so.

Frightened by her own ambition, Timo was about to flip closed her notepad terminal when a message appeared on her screen. Surprising to Timo, she could not trace it. It was disguised as though it had come from her own terminal. Intrigued by whoever had the savvy enough to bypass her tracking capabilities, Timo opened it, which perhaps was the moment that put her over the edge in her impulsion.

A thinly formatted pamphlet scrolled down her screen. The title of which seemed to read her mind and the content lit fire to her impetus. She couldn’t imagine how someone would have known to send this to her at this moment, but she didn’t know that thousands of women were receiving it at the very same moment. Paranoia can be forgiven when living six steps from a duplicitous potential murderer who had spied on her biological processes, and probably even stolen some pee.

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*The Manifesto of the Mothers of Freedom.*

*A voluntary, value-based society entered into with ideals and passion for the upholding of same will produce greatness so long as the participants frequently renew the two conditions imparting upon it the title society. As flux in participants, developing technologies, and changing times require varying responses and degrees of flexibility, the values or implementation of such may deviate from the original values upon which the organization is founded. As any organism must evolve to best take advantage of its surroundings, so must any society to preserve the cohesion of agreement, which is the only difference between a participatory gathering and a society. Whether a direct democracy or a democratic representation reviews the moral underpinning of the community makes little difference, as the pace of transition of the community’s values will in every case be sluggish and latent to the need for the values to change. Many ungrounded and baseless mistakes have fractured the shared understanding of agreement by assuming the mantle of protecting one’s virtues or hastening the transition of values through despotism in the former case and revolution in the latter. Protecting one’s virtues for the sake of the virtues or erroneously for the sake of the society is as destructive as hastening change through a process like revolution that excludes those who appear to have control over the decisions affecting all participants in the society.*

*The axiom of volunteerism is as necessary to the success of a burgeoning, primeval, ancient, or evolved society as the previous discussion placed on the concept of value-based. Do not confuse the term with the act of joining alone; the option of leaving a society as a free and available choice is as important to the survival of the society as the regular review of what the society stands for. When opportunities for factions to escape what they view as tyranny, chaos, or base vulgarity are provided with ruth and intention, they ultimately strengthen a community. Growth and progression through the seeding of a larger network of communities with the fundamental shared concept of what designates a society: voluntary and value-based; the cohesion of agreement. Whether to maintain population, control information, or other nefarious ambitions akin to slavery, which is never a facet of a functioning society, rather a harbinger of its destruction, the removal of voluntary participation in a society reduces the group to a weak and inflexible condition premonitory to its collapse. Participants will be as likely to work against their own success as for it with no commitment to the founding ideals or ownership of the values informing decisions.*

*Drastic action is not called for to redirect ill-informed and mistaken digressions. Only these steps need be taken:*

1. *Grant amnesty to all usurpers*
2. *Relinquish ego by those who shall lead the transition*
3. *Transparency and open participation in the review of the society’s values*
4. *Open gates to participation, whether to join or secede.*

*Examine the tenuous cohesion that bonds our kinship, sisters, and determine whether it is based on agreement and understanding or not. And if you deem it not, choose your action well, for whether or not we effect a society, our numbers and resources are such that our fates are inseparably woven.*

*The Mothers of Sons*

The signature at the end of it was so provocative, so timely, so uncanny in its accuracy to Timo’s predicament, that she should have screamed like she was bitten. But she didn’t know what the word, ‘Son,’ meant. She fished around on her compartment for something to print it on, decided to lay out a shirt and projected it onto the smooth part of the garment. She sprayed toner on the exposed part of the shirt and pressed print. Her notepad beeped and she waited as the words etched gently into the fabric. Then she deleted all traces of it from her machine. Staring at the signature at the bottom of her shirt, she simply assumed that it was an alternate spelling of a word she didn’t see very often, ‘Sun,’ and accepted the implied metaphorical reference to dawn and new beginnings and all the vague interpretations that came with references to the distant star.

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Councilwoman Pallas sighed with annoyance as she listened to the torrid stream of interpretations of the accident. Everyone’s presumptive anticipatory evaluations of what the pregnant scientist’s reaction would be filled the air with a raucous din. Her desk sat on a raised dais overlooking her office pool – which normally functioned with the greatest efficiency, but today was derailed by the terrifying news of a severe death. The councilwoman had once been invited to camp in the center of the large greenhouse, where flocks of beautiful birds are kept. The excursion was supposed to be restful and rejuvenating. The truth was that as the ambient light came up to simulate morning, the birds had made such a noise that there was no rest or relaxation to be had. Like those haughty plumed avians, Pallas’s workers chattered on incessantly. Occasionally a good idea would bubble out of the effervescent prattle and a woman would lift a notepad and send out a press release or a call for a meeting or a request to divert resources here or there. The disorganized scene made Pallas wonder if most of the efforts they attempted weren’t working counter-productively to those proposed just minutes before. Rather than step in and wreck their therapeutic hustle-bustle, Pallas let her team move through all of their moods and feel as effective as they could possibly feel. She knew it made no difference how many lights were turned on or what resources were directed to the rescue bay. The deep diver rescue submersible had already been dispatched and there was nothing else anyone in the hub could possibly do except worry, which her team was doing fantastically.

From her position on the settlement, she had a pleasant view of the depths. Her office was cradled in the outer wheel of an oversized turbine that was spun by the upwelling, giving the settlement both electricity and more reasonable feeling of gravity - at least to those lucky enough to be on the outer wheel of the turbine. Pallas had enough sway on the council to have been able to request this location. She knew her health required it. Both her mothers had brittle bones and would have benefitted from more exercise, especially more weight. Pallas looked at the backs of her hands as they typed. The dark spots were multiplying and her bones were more visible, as though the essence of her were evaporating from between her bones and her skin. She remembered being beautiful at about the age of the engineer who was missing. She looked at the file open in the background on her notepad, which had Cassiopeia’s picture and vitals, then pushed it aside again, out of view.

*What if I caused this young woman’s death?* She thought. *Nonsense, if there were any intention behind this accident, it was all due to that power-hungry saboteur’s rash behavior. I am not to blame.* The number of times a person says something to herself actually can make a difference in whether she believes it or not.

Pallas’s chief of staff came to her desk, a tall young blonde woman with pinched dark eyes drawn together in a slender face. She had an overall appearance of shrewd capability. “You need to see this and then we need to make it disappear.” She showed Pallas the manifesto on her notepad.

Pallas nodded, “Is this on every machine?”

“As far as we can tell,” she replied.

“Get me a hard copy and get rid of it, every trace. How long has it been posted?”

The young woman grinned and handed her a prepared copy and said, “Done and we’re on it. We’ve sent out a sniffer that should have it totally erased from existence on every machine under the ice in moments. It only just arrived in my terminal, so its total life may be seven and a half minutes.”

Pallas quietly appreciated Diana’s efficiency. “Who sent it?”

“That will be harder. Once it is gone we will put more effort into that, it was posted in a pretty clever way, every machine looks like it sent it to itself so we can’t seem to trace it.”

“Find the person who sent this and bring her to me.” Pallas thought for a minute. “If you can’t find the person who sent it, bring me a few people who would have been clever enough to get our notepads to do that.”

Diana nodded and was about to go. Pallas called to her, “Wait, hype up this fallen engineer, send out updates and posts that will be more likely to be opened than this manifesto. Bury it. Make it a bother to be read. And do it fast.”

Pallas looked down at her office pool again, this time looking to see if any of them were turning to their notepads. She decided to draw them away with an uncharacteristic group address. She cleared her throat, “If I could have everyone’s attention, please.” Diana continued through the turning throng and pulled two choice women from the audience as Pallas began to share “…our sorrow for the trauma that has befallen this close family and our hope for the welfare of our sister…”

Bouncing Baby Bi-maternal

The welfare of their sister, as they entered into ceremonial song, was grim. Well, not from her perspective, okay, yes from her perspective, it was pretty grim, but stable. Cassie thought that perhaps now she had four hours left of life support and that would give her an opportunity to either come up with a plan or get picked up by a search team. There were, however, three things that she didn’t know.

The first looming source of death was that the down-welling vortex that had captured her had moved her laterally as well as downward, so that she was miles from the area where the submersibles were circling in perpetually widening hopeful arcs. The second grim fact was that the sucker eel that she had “discovered,” hmm… thoughts of naming it the *Cassiopeia eel* distracted her for a moment, that eel, regardless of what it would be named, wasn’t the only thing in the sea that ate the gently winging harvester skates, some of the eaters had discovered that it helped to be big and toothy. The third obstacle to a slow and quiet death, which actually leaves her better off than she could have been, was that the ocean floor was hastily approaching. She would have been dashed against the rocky etched seafloor if she hadn’t noticed her sideways moving bubbles earlier and moved out of the downward current. As it was, she was still coming down pretty hard, with the impact likely to damage her suit if she didn’t notice it and change something.

In her lonely descent, accompanied solely by the sparse flotsam that revealed itself only in her lights - which Cassie now flipped on, counting out loud to be sure she didn’t indulge, Cassie’s thoughts were silly and loud. She regretted never taking a mate, even though it simply never appealed to her. This may seem like an obvious regret in the final minutes of one’s life, but she didn’t think about it from her heart or her lonely soul. Her soul was fine. She liked the people she met and worked with and she liked her work. She was thinking about sex. How stupid, I’m about to die and I’m thinking about sex, well sex education.

It just seemed awkward, especially to a woman with a degree in biology, that a species would benefit by evolving to a stage of needing to use a laboratory to propagate. She had been taught that it was more advanced and did away with dangerous entities and practices, much like the advent of cooking our food and washing our hands had changed with technology. Each act replaced a seemingly more natural practice with something that now, in retrospect, made absolute sense. Yet bi-maternal reproduction seemed unprecedented. It is not like that of predatory wasps of *hymenoptera* and not like the spontaneous female salamanders in the labs, which all produced clones of the mothers. In fact, most fauna on Europa practiced pathogenesis. Mammals couldn’t do that, not even with the advanced labs of Europa. The famous mouse name, Kaguya popped into her mind, the first lab-assisted bi-maternal mommy mammal. She wondered why the offspring weren’t the famous mice. She also wondered whether that mousy Kaguya ever returned to the moon, like her Japanese namesake, or if she found her way to a different moon altogether through the settlement here on Europa. Something for fairy tales, for stories about little thumb-sized babies found inside bamboo stalks. Actually, the lab test tubes…

It would be noble if the doomed woman had been thinking entirely about science and biology, but she was thinking about sex. The sex taught in sex ed. classes seemed awkward and strange, so she avoided it. Like lab-assisted life on a moon, this girl didn’t accept that there was no other way for her to be satisfied, and now she regretted not seeking out what that other way may have been.

Cassie’s thoughts went very quickly astray through sex and life as she watched the neighboring down stream slide and angle away from her at more and more of a horizontal pitch. In fact, she had only counted to seven by now. Leaving her light on, she watched the slipstream turn. *How odd… what would make it turn, unless…*

Suddenly terrified, Cassie aimed her light below her. She couldn’t see a surface, but the occasional winking or twinkling glint of a polished surface reflected her beam. Thirty meters and closing, fast. Cassie had a vision of an astronaut who fell on the surface and cracked her dome. Twenty meters. She aimed her hands and feet at the seafloor and fired her water jets at full. Ten meters. The jets barely slowed her. Her lights fully illuminated the impending surface, flat with dune-like ripples and the occasional rock. She had two visions. Cassie saw herself dashed on the seafloor, in a crippled and leaking suit. Then she had a vision from her childhood of a piece of paper coming to rest on a desk and immediately made herself pancake-flat. With her arms at her sides and her hands on either side of her dome, she pulled her legs tightly together, hoping to trap as much water between herself and a hopefully flat, or even better - soft, surface. Don’t panic. The last meter came quickly, too quickly, Cassie strained to not close her eyes. Staying rigid was no problem; she was so tense. She felt a rush of a cushion of water squeeze out from between her and the sandy floor. In the last second, she slapped her hands at the sand and tried to lift her head. She belly-flopped into the sand and managed to bounce feet-over head and slid along on the head of her suit. She flipped entirely onto her back and slid to a rest. The stirred up sand made a cloud of twinkling stars in her twin beams of light, which blinked once and then failed. Cassie listened. She heard nothing, which was a tremendous relief, but she smelled the iron-ozone smell of blood. Her head had hit the inside of her own helmet pretty hard. She thought of embolisms and aneurisms and narcosis and concussions and then thought nothing.

Cassie passed out. Which probably saved her life. As she lay unconscious, for only a few minutes, she was covered in a thin layer of silt. To the casual passer-by, she was no more than a silt-laden rock formation, like those that jutted out unceremoniously along the barren wasteland – the cairns marking some arcane path along the true surface of this moon.

Timory ran test results and code across every monitor on the bridge. The key was to look overwhelmed, not just personally, but by her space as well – and, like in the DuPont home for the genetically impaired, to occupy all the space around her. Ari came in, and found no conversational hook took and no tuffet upon which to suffer her impersonation of someone who cared for Timo’s personal welfare. She dropped commiserating lines and tried to bait her with talk of the settlement, she even tried work-talk and finally pregnant woman questions before giving up. Timo reflected on her visit and felt disgusted that she had to keep up the charade. Of course, as soon as Ari had left, she initiated what she had truly been working on. With the last few keystrokes, Timo re-routed Ari’s cabin’s air so it bypassed the carbon scrubber, so that her occupancy would slowly increase the CO2 content until she passed out, thinking simply that she needed a nap.

*Finally, a few moments to think without the paranoia that every facial expression is the one that is going to give me away,* thought Timo.

Somewhere in the recesses of the rim of the city, along one of the sinewy tendrils of civilization snaking through miles of cold empty ice, someone was watching Timo. Not literally, but she had enough live feed data from various sources that she knew everything that other people communicated about her and everything she did with her notepad – which for an expert programmer and computer science genius, was most everything. And she was not alone. “Send the submersible crawler to retrieve the programmer. No need for weapons, there should be no interference now.”

Book 2

If someone were to come visit from Earth, they would see an improbable and unrealistic application of thermodynamics had developed in the century of Europa’s independence. The upwelling of warm water not only helped to buoy the wheeling contrivance of hoops and disks filled with air and women comprising a segmented squat spire, a metallic and glassy stalactite peering down into the abyss, they also sent each pancake layer spinning and whirling about the central axis at approximately the same speed. Regular indents of windows dimpled each rim to create the appearance of a glowing hive. Swarming skates and harvesters drawn by the light’s promise of nutrients completed the illusion. They had learned this association from the gentle glow of the photo-luminescent algae rather than any remnant of the faint transmission of the sun’s pale glow along cracks and windows in the ice.

In her unconscious state, Cassie dreamed that she circled the giant conic lantern with the other skates and harvesters, swallowing gallons of brine rich with plankton and nekton and ejecting the effluvial waste water like a slow jet engine. She circled one of the levels, keeping pace with its revolution. From her position in a locked orbit, she could see into the office apartment of a wicked woman wielding great power through a billion tubes and wires emanating from her hands and scalp. The intricately wired woman saw her and narrowed a semi-permanent scowl into a fearsome glare. The window rotated away from Cassie so that the point of the spire pointed directly at her. The revolving layers lined up along a seam that ran from the tip back along two sides of the spire. The whole contraption seized and began to split as an enormous dimpled glowing beak opened on Cassie and sucked into its capacious maw volumes of swirling water. A maelstrom of water creatures swirled down its gaping throat. Cassie tried to swim away, but could not escape.

Cassie slid and rolled to a stop with a thud against the silty seafloor. Her eyes shot open and she breathed in a panicked haste from her dream. The seafloor she had been laying on broke and a ten foot wide pad swelled upwards, purging all of the detritus and silt along with Cassie. The sea floor flopped back down next to a stunned Cassie. The part of the floor that had moved was roughly circular and now that she knew where to look, slightly paler than the floor itself. She wanted desperately to shut off her light, but didn’t dare move either. There must be a reason for the floor moving like a beach blanket. She edged slowly away from the pale surface. Some creature, she surmised. As she stood up, she felt the pressure of the downward current pushing on her laterally now, toward some unknown place where, she hoped, there would be some answers and an elevator. Careful to look at the floor around her, she could see now that there were pale disks partially covered with silt all around her. The one she was just sloughed off of was fairly large compared to the other disks she saw in her faint beam.

Curiosity got the best of her. Cassie reached her foot out over the pale disk and tapped her foot. Once. Then she slid her foot side to side. The two sides of the disk lifted to clap shut, like a giant taco, about her leg. She leapt back, and landed squarely on a much smaller one, which wrapped itself around her torso. She pulled at it and found that it was sticky now that it was active. She could get it to stick to her arm and then her hands like the tar-baby and like briar rabbit, she worked the hat sized flytrap onto the larger one.

With the scare passed, Cassie watched as the giant taco flytrap mama tar-baby settled onto its side, vent-flaps let the water move through its waffle form. It must have noticed it had no prey, as once it was down on one side, it let the top-side of the taco unroll onto the sea floor and it was peaceful and expectant once again.

Crap. Cassie looked down current and saw dozens of them in her beam. So much for saving battery power, she thought. 38%. Better get moving. She looked ahead of her and slid her feet carefully along the bottom, hoping to disturb any more giant Europan flytrap long before she actually stepped on them. She slid around the larger ones and tried kicking the smaller ones. They flopped up and out of the way. As she skied along, she saw that many of the disk traps were folded over with some bulge in the middle of them. As she kicked up the smaller ones, she noticed that they changed their surface, it went from a pale appearance to becoming much darker. Skiing along with her light draining her source of air without the lung crushing effect, Cassie couldn’t help but let her mind explore the potential application of a smooth and sticky toggling surface. Anywhere Velcro, she thought. If I get out of here. 37%. If I get out of here, I think I just might have my meal ticket with that invention.

36%. Imagine the homecoming, possibly out of air, revived in the infirmary and what do I ask for? A sub to return to the bottom! Who could have thought that a doomed girl, skiing along the chilly ocean floor on a barely populated and hardly thriving planet, surrounded by deathtraps and low on life support, could make herself laugh. She did, though. 35%.

Cassie noticed that the battery was being depleted by the light faster than she would have hoped. If she got to the hot spot, the source of the upwelling, she might not have enough power left to live through the return journey. That was when she realized that she had had a plan all along. And not a very good one. She was going to follow the current. *You clever bitch*. She swore at herself. *You think you are going to just hop into the hot upwelling and get carried up with the rest of the nutrients? What if it’s too hot? What can this suit withstand, anyway? What if it’s corrosive? What if there are even bigger and stranger creatures at the hot spot that might be more active than these death waffles? What if this isn’t even the way to the upwelling? Of course it’s the way*. She panicked. *What if this is the way to* an *upwelling, but not the one under the city.*

The way she saw it, she had two choices. Either turn off the light and hope that her shuffling would trigger any flytraps without her ending up inside them, or go faster. She tried moving in the skiing motion faster. The current’s pressure at her back was helpful. But she could not move her legs in the water much faster than she already was. At least it helped keep her warm. She turned the thermostat on her arm down to 11°C. When she looked back up, she saw an impasse.

Before her, like the marshaled ships of some alien invasion, was a line of very large disks with no path around them. She tried to stop, but her new pace with the current pushing on her made it impossible. She began to fall forward, likely to land flat in the center of the nearest disk, so she jumped.

As she left the sea floor, her feet swept back underneath her and she felt herself nabbed by the current. She surged about thirty feet over the hungry line of enemy woman-eating waffle disk creatures and landed in the silt off balance. Again she felt herself falling forward and had no choice but to lift off again. Between the decreased gravity, the current, and her adrenaline, she leapt upwards of fifty lateral feet per leap, and found herself nearly able to control her jumps by putting her hands and legs out to coast and pulling her limbs in to come down. She had several near misses, where a sudden rush of silt indicated a waffle trap clapping shut just behind her, trying to nip her out of the slip stream.

The current was getting stronger. No doubt about it. *So these things eat the skates and harvesters that swim too low, so… what eats these?* She thought. She figured she’d find out soon enough, what with the energy at the hot spot being so much greater, there was bound to be strange giant and hungry creatures to greet her.

Cassie had read about the botched attempts to explore the upwelling. It had seemed, to her engineering sense, a simple matter to get to the sea floor vent. Thermal information would point directly at it, like a bright red beacon. The teams had been able to fly their submersibles over the planes, *But they obviously never set down, since these deathtraps never got reported.* Cassie had a new, strange thought. *What if all of this* is *charted and these creatures and worse are well-known, but someone thought it would be better if the rest of us didn’t know about all the different ways we could get swallowed up on any routine outing?*

The first stages of diver’s narcosis are ease of mind and a sense of well-being and calm. A moment of Zen. This can easily and hastily transform into giddiness, over-confidence, and sometimes paranoia. It would be unfortunate for a young well-read engineer to become over-confident to the point that she denied her own potential situation as her suit failed to absorb most of the pressure and instead passed it on to her, forcing more nitrogen to dissolve in her blood. Cassie calmly leapt into the current and used her jets to pull herself upwards a hair as she noticed a new breed of clap-trap plant that stood on stalks which might be worth avoiding. Cavalier in her abandon, she hooted as she hoisted her legs over them and pushed off their closing lips.

Floating along now held aloft by the pace of the slip-stream, Cassie’s wits were hastily returned to her. She was certain she saw something white and segmented darting among the stems of her unlikely forest. She focused on staying buoyant, which she wasn’t, but she managed to utilize the drag between the top of the current and the slower water above it to generate some lift. A soft ping redirected her attention to her arm-display.

For reasons that had very little to do with her engineering degrees, Cassie had chosen 20% battery power as the psychological breaking point. It was the number below which she was certain she would not be able to make it back to the city, even aided by the lift of the superheated water jetting her toward the icy ceiling, she knew she would not be able to breath. The read-out pinged her, flashing 25%. She studied the numbers and almost lost track of what she was doing with her body, half in and half out of the current’s vortex, in a ridiculous flying position like some fictional childhood heroine in a cape. She had no reason for why 20%. And yet, these calculations that she did more with her liver and spine than her brain or heart tended to be just as accurate. She knew to fear, but still the fear didn’t come. She stayed calm, soaring over hungry woods and their equally voracious denizens in a strange environment. Cassie was sure that humans were not meant to be here.

“Either she’s dead, sorry, it’s true, but hear me out. Either she’s dead, she’s unconscious and therefore impossible to locate – which means also dead, or she is alive and can’t contact anyone. So let’s say she’s alive. If she’s as clever as you all say, then she’d be working her way toward the only elevator that would get her off the sea floor. That’s why we’re going there.”