

# The Shepherd



A Climate Science Fiction Story

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The Shepherd: A Climate Science Fiction Story

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“The passage of the mythological hero may be over-ground incidentally; fundamentally it is inward, into the depths where obscure resistances are overcome, and long lost forgotten powers are revived, to be made available for the transfiguration of the world.”

-- Joseph Campbell, *The Hero With A Thousand Faces*

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## Romance: Act One

“How is everything right now?” she asked herself. Only that which qualified as being available to her immediate senses was addressed by this question, every perception and sensation – but not thoughts about these things, not worries about the future or regrets about the past. Sounds of mingling. A scent. Her slightly elevated heart rate and temperature.

He had noticed her as she entered the meeting room. Like most other attendees she had a friendly demeanor, open and willing to engage in whatever pleasantries might be required.

She walked to the first available chair closest to the front of the room. She visibly relaxed, folded her hands neatly in her lap, and lowered her gaze. Shoulder-length strawberry blonde hair parted on one side, fair skin. No makeup he could see. He was looking closely at her face.

She had been looking through half-closed eyes at the carpet below her chair. Now she raised her eyes and met his.

He was standing to one side of the front of the nondescript government meeting room. A tall man, dark, clean-shaven with rough-hewn features. In his thirties maybe. A smile that showed only in his eyes. Still in the afterglow of her brief meditative state, she felt in his gaze only a moment of communion. No agenda. She smiled politely and turned her attention to her minister approaching the lectern.

Deborah Sanders, Minister Of Environment and Climate Change Strategy, stepped up to the microphone. “Good afternoon,” she said, addressing the ministry-wide audience.

“As you know all indicators of global climate change have accelerated dramatically over the past months. At this point the international consensus is that this is the tipping point we have been warned about for decades.”

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She heard the crunch of his steps on the parking lot gravel before she saw him. She straightened up from tying her hiking boots. He smiled this time.

“Daniel,” he said extending his hand, “I remember you from the climate meeting this week.”

She pushed back her hair saying, “Sarah,” and smiled in return, taking his hand. She reached into her pocket and clicked her car’s electronic key lock with a beep.

“Come here often?” she asked with a hint of humor.

“No I, it’s the first time I’ve been to this park,” he answered earnestly. She saw that he was not familiar with her line.

“It’s my church,” she volunteered, “I try to hike every Sunday. It helps keep things in perspective.” He smiled in response. She surprised herself by asking, “Care to join me?”

“Yes, that’s very kind of you, thank you.” Both smiling now, they walked across the parking lot to the trailhead.

She thought that despite his good looks there was nothing of the charmer about him. In fact, he seemed somewhat boyish. She felt comfortable with him. Meeting him here somehow lifted her spirits. She felt more herself. Free. She looked around at the surrounding forest happily. They walked on.

She almost always hiked alone. Born and raised in a small town near Portland Oregon, the outdoors had always been a major part of her life. As with any woman, she took her personal safety seriously but once in the woods seldom felt any sense of danger. Those kinds of animals stayed near the city.

Her parents had worked in administrative positions in local industries as her siblings did now. She had not fallen far from the tree. However she had taken her love of the outdoors a step further and pursued a degree in Environmental Studies. Climate issues were of course on the radar already and it just seemed natural to her to follow up with studies in Climate Science. She chose a program offered at the University Of Victoria which was where she met her husband.

Daniel seemed content to walk along admiring the park. After all, why are we here, she thought to herself with slight amusement. Her many years of practice in Vipassana meditation enabled her to be content with the present moment far beyond what the average person could endure. She loved nature and the science that made it so much more interesting but there had always been something about it that science did not answer. Something beyond words. The feeling had created a space in her heart and in it was born a seeker of another kind. Through a friend in her yoga class, she had been introduced to the local Victoria Insight Meditation Society. There she had found something with the rigor of science that she could apply to her spiritual quest.

However social convention is a persistent force and she eventually felt comfortable surrendering to it.

“Do you hike often?” she asked, rephrasing her earlier question.

“Yes, almost every weekend if I can get away,” he said lightly. “I came to BC for the outdoors. I grew up back East. Toronto.”

She smiled looking sideways at him. “Tell me more.”

“My parents are Israelis but they are about as Jewish as most North Americans are Christian which is to say not at all. They immigrated to Canada before I was born so I don’t know a great deal about their time there. My father worked as a contractor for the Canadian military. His work was an off-limits subject at home. Retired now. My mother stayed at home raising my brothers and me. Pretty traditional. My brothers were older, born in Israel. They had their own lives and interests. I was pretty much left to my own resources. I never felt much connection to it all.”

His expression became quizzical, as if considering a question he had never been able to fully grasp or resolve. After a moment he went on.

“I started a degree in Psychology, Psychobiology actually, as I’d always been interested in what makes people tick at the hardware level. But I got involved in campus politics. My interest was not so much party politics as much as how the political machine worked. I enjoyed organizing things behind the scenes. Through a connection I was offered a similar position with the local Liberal Party and decided to take it.” He was squinting into the sun now as they walked.

“Shortly after I was offered a position with the government here as the Premier’s personal assistant. An Order In Council public service appointment, not a party position,” he explained. “I felt nothing really holding me. The chance of getting out of the city seemed serendipitous and the job description appealed to me. It seemed like a good move.”

He had become somewhat remote during his short speech, as if describing a path seen from afar and one he did not care to revisit. But now he finished with a shrug and smile, “Here I am.”

“I understand you work closely with your minister,” he continued looking at her more seriously. He would know as much given his position and the fact that Premier Patel had spoken after her minister did at the meeting.

“Yes,” she answered, “I prepare most of her briefing documents with regard to climate issues.” She had not intended for their conversation to lead to this but it was inevitable she supposed.

They had reached a low summit above the lake which could now be seen in its entirety below them. Large birds, with a wingspan of a meter or more circled above them. He

seemed to be more present again and followed her eyes skyward. "Eagles?" he ventured.

"Turkey vultures," she answered. "Although there are plenty of eagles, hawks and other raptors in the local parks turkey vultures are more common. Not so majestic up close I assure you," she laughed, "but they have a role to play like everything else."

"It's beautiful," he said turning to her, "thank you for bringing us up here." She smiled in response, feeling the warmth return. "There are some lily ponds further on. They should be in full bloom this time of year. Come on, I'll show you."

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They were having lunch at the government employee's cafeteria in the legislative precinct. About as charming as a hospital ward. Daniel was saying, "The Premier thought it would be a good idea if we developed a working relationship. He and Minister Sanders are in daily contact now and with the growing need for regular public communications, events, etc. he thought it would be helpful if you and I had a more coordinated view."

She hadn't been sure how she felt about this when he'd emailed her. Part of her was pleased at the thought of seeing him again and even working with him but another part wanted to keep him in that separate world of their own. Showing him the park had reawakened something in her she had not felt for a long time, not only her childlike sense of the wonder of nature but the joy of sharing it.

Seeing him now she felt her doubts fade. The connection they had formed at the park, a personal, honest connection with no agenda, carried over. A friend. Still, these days she was normally working all day and most evenings researching and preparing documents. She needed to know how this was going to work.

She nodded thoughtfully over her salad in response to his explanation. "Makes sense. Can we start with some broad strokes? What exactly do you do for the Premier?"

"Sure," he answered. "The job description says Personal Assistant. So if he's traveling I may go with him and take care of all the details. If he's returning from somewhere on his own I'll usually pick him up and drive him to wherever he needs to go. All hours. I do most of his driving sometimes accompanied by another member of our team, a plainclothes RCMP officer.

"It's not James Bond stuff," he said less seriously. "It's just that the Premier has more important things to spend his time on than driving. In the car he's usually catching up on documents or on the phone. At the extreme I take care of anything he needs taken care of personally. At the office I spend most of my time coordinating the logistics side of his activities. I deliver him, he delivers the message. I have one clerical staff who helps me



with that. I also accompany him to some internal meetings. There's a lot of administrivia involved in running a government and in some cases it's easier for him to have me along as a fly on the wall than to have to relay things to me afterwards. Sometimes we get the opportunity to chat but not often. Even then it's mostly him using me as a sounding board. Part of the job. He's actually a very genuine guy on the personal level and I like his politics. That makes things easier."

"And where do I come in?" she asked looking up between bites.

"The Premier thinks it would be a good idea if I kept up with the inside view of the direction your minister and therefore he will likely be heading. Not that he needs me as a channel for that information of course but he feels I need to know how things are likely to change for him going forward in terms of day-to-day activities. He expects the climate change issue to increasingly take the lion's share of his time. I can plan better if I can see a bit further down the pipe. Your minister suggested to him that you could give me an unvarnished view of the likely road ahead. An informal heads-up meeting like this from time to time is all I'm hoping for."

She responded in kind to his honesty. "No one, not you, not me, and not our superiors, is going to be able to stay ahead of or on top of this thing. It's too late. It is no longer manageable and is beyond any office cliché regarding dealing with something. A tipping point is chaotic by nature. All we can do is try to mitigate and adapt as fast as we can. We will soon be on a war footing. This is survival. That is my unvarnished view."

She felt more emotional than she would have expected. She was flushed and could sense that if she did not address it she would be shaking and on the verge of tears. Daniel was looking at her calmly but with open acceptance. She had of course told the same thing to her minister but with the professional delivery expected of her in that context. She felt relieved to be able to express her feelings.

"Soon it will be all the Premier has time for," she continued. "In the coming months and years, the priority of everything else the government does will be defined by climate change. Most of the rest of the government will reduce its activities significantly as it did for Covid-19. A little more gradually perhaps but it will happen simply because there will be less time, money, or other resources for anything else. On top of that will be the associated social issues that will have to be addressed. The political opposition will soon fold and cooperate one hundred percent but the public will struggle terribly with coming to terms with all this. I suggest you tell the Premier you will need to bring on some additional staff to support you if you ever want to sleep again."

"Thank you," he replied, still looking evenly into her eyes. "There's a lot of speculation out there so it's good to know which scenario we'll be working with. What do you expect in terms of government activity over the next couple of months?"

At the end of their meeting he asked if she was going hiking on the weekend and if she would mind if he joined her again. She was still wearing her wedding ring. "Yes," she said with some relief, "I'd like that."

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Bringing on additional staff was not something that would work for Daniel. He needed to be the one traveling with the Premier, the fly on the wall at meetings with the Premier, and the one chatting in unguarded moments with the Premier. His parents were not from Israel.

## Romance: Act Two

Sarah sat in her one comfortable chair in her apartment. Hands folded in her lap, eyes half closed. She had been renting the apartment now for some months since leaving her husband. He had called again earlier in the evening as he often did. Nothing had changed for her but she could not be harsh with him or even impatient. It was not in her nature. She was simply unwavering, a broken record that repeats the same thing endlessly. The call ended as it always did, her firmness hiding the pain and doubt in her heart.

He was a decent man, honest, hard-working with no vices and a secure career as university staff. She had just eventually admitted to herself that she did not love him. It turned out they had little in common. The trajectories of their lives had crossed once but then continued, each on their own path. He was content with the mundane, accepting the life he was offered without question. He was satisfied with that. She was not. She was passionate about life, romantic, a seeker. Over time their differences had become more obvious and the seed of discontent had grown in her. There were no children. She had wondered if that was somehow telling. And now she was 35.

She considered herself a sensible woman so this had all been unwelcome. She hated hurting him. She felt selfish and foolish and had a thousand reasons it was her fault. However she found there was no reasoning with her feelings. Trying to do so only led to endless circles that never provided any clarity or resolution.

But she had a document on her computer with a due date of tomorrow and she needed to focus. She mentally turned to her Vipassana meditation practice.

Take refuge in the present moment, was her last thought as she allowed herself to sink into the collection of sensations and perceptions flowing as the endless, quiet streams that made up her consciousness. Slowly her mind calmed, settled, and cleared like a still forest pool. She became aware of her slow, even breathing, the pulse of her blood, and now that she was focusing on this level of awareness, a slight headache. When a thought arose in regard to her perceptions she did not pursue it but only labeled it as she would an itch and dismissed it as immediately. An itch, a pain, a pressure, a longing, she thought fleetingly. She sat without even a flicker of movement amid the dust particles drifting through beams of the last of the evening's light.

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"How did your meeting with Sarah go?" asked Premier Patel popping open a pistachio from the bowl on his desk. He was a politician, good with names. They were in his offices, in the East Wing of the parliament buildings.

“Very well thank you sir,” replied Daniel deferentially. “She agreed to meet with me informally every month or so to keep me abreast of any developments she anticipated.”

He kept to the point with the Premier; be specific and there was no need to go over ground already covered. Something the public often failed to appreciate was that you had to have exceptional intelligence to be a political leader. Top percentiles. There was more than one kind of intelligence but whatever your strong suit was as a political leader it had to be lightning-quick.

Premier Patel had originally risen in his own ethnic community in the Surrey, Langley, and Abbotsford municipalities just south of Vancouver. Lying along the fertile delta of the Fraser River the region’s historical economic base was agriculture. Premier Patel’s family, among the mostly South Asian population, had been farmers there for generations. Issues of land and sustainability were ingrained.

“What did you think of her views?” he asked Daniel now.

Daniel had experienced this often with politicians over the years. They used everyone as a sounding board, either to test out ideas or in a kind of ongoing, ceaseless polling. The Premier was a consummate politician, remarkable at retaining facts and information while at the same time being highly intuitive. Premier Patel’s social intelligence was extremely high, probably ranking one in a thousand in any population. But he was no match for Daniel.

Daniel met his eyes now. “They made sense to me sir. She cut a pretty clear path through all the differing opinions I hear on the news. Her views are backed by a great deal of conviction and as you and the minister have come to rely on her I have to assume they are also well-informed. All in all I came away feeling that she can be relied on. It’s rarely that straightforward a matter to settle things with me.”

Premier Patel had liked Daniel from the moment he met him. He noticed most people did. There was a kind of animal magnetism about him that Patel understood. He had been immediately comfortable with Daniel and felt instinctively that he could trust him. Privately Patel prided himself on his ability in this regard. He listened now to Daniel’s words and felt his own positive opinions about Sarah’s views reinforced.

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Daniel was walking across the back lawn of the Parliament Buildings to grab a bite from the Good Earth Coffeehouse in the new Capital Park area of the precinct. His work with the Premier was going well although it was not the work the Premier’s team had hired him for. For all the years of preparation he had been through, the actual work itself was trivial. It involved almost no effort, requiring little more than his presence. He walked on enjoying the moment, the sun, the grass, the scents. Compared to Sarah’s state even in

her peak moments of success with Vipassana meditation, his normal state of awareness and sense of the present moment was beyond anything she could imagine.

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Mount Douglas Park was smaller than Thetis Lake Park but it had its own unique features and appeal. They met in the main parking lot and headed first down to the beach opening onto Haro Straight.

“Have you been to this park before?” she asked as they scrambled over the boulders to the beach. She had to get a new line, she thought. She was smiling at herself but not just because of what she thought of as her lame conversation. She was happy to be with Daniel again.

“No I hadn’t expected it to be much of a hike as it’s embedded right in the middle of this neighborhood,” he answered. Surrounded on three sides by urban development it did indeed seem an unlikely place for a rough terrain hike lasting a couple of hours.

“There’s is a road right to the top but we’ll go around and up the back way,” she explained. “It’s a good hike. The long loop can take an hour or two depending on your pace.”

The beach was small with grey sand, strewn with boulders, seaweed, and driftwood. Seabirds were scattered here and there. They walked to one end and back in silence. She had never known anyone with whom she was so comfortable with silence. She never felt the slight anxiety she normally felt during pauses in conversation. It seemed so natural to him, as if he assumed long stretches of silence were a normal part of spending time with someone. She tried to think of when she had experienced anything like it before. Rascal, she thought. Rascal had been the name of her black lab when she was a girl. She had rescued him as a pup and they had been faithful companions for twelve years. They had gone on lots of hikes together before he passed away.

Daniel had found an unusual shell and was bringing it to her. Rascal, she thought, smiling into his eyes.

“It’s an abalone shell,” she said. “A kind of sea snail. It’s rare to find as they are so beautiful they are usually collected very quickly.”

The inner part of the elegant bowl-like shell was six inches across of mother-of-pearl. “Shall we head up?” she asked. He placed the shell back on the sand and they turned to go up the hiking trail.

She led them along the coast path above the cliffs until it crossed the main road to where the trail meandered for a bit in the lowlands. They passed through a cedar grove

as silent as a cathedral, among ferns taller than they were, and through clusters of pines deep in ravines heavy with moss. As they emerged into the sunlight they encountered a few Arbutus trees. He ran his hand along a young one, feeling the silky smoothness of its limbs. A momentary shudder of warmth ran through her body. It was the first time she'd felt that way around him.

She found herself suddenly talking. "You mentioned you had started a degree in psychobiology," she said. "How is that different from psychology?"

They were on a dry, sunny outcrop. He stopped and paused for a moment as if gathering his thoughts. Turning to her he said, "It studies the relationship between our entire body, our brains, and our mind. It looks at everything from genetics to hormones to evolution and anything about our bodies that would affect how we experience the world and behave. It's a really broad field as you can imagine and for that reason not highly regarded academically. As a career path it is considered as inadvisable as an interest in the search for extraterrestrial intelligence would be for someone pursuing a doctorate in astronomy. You don't get taken seriously.

"But I don't believe in ghosts," he continued. "I was, am, interested in psychology from the point of view that something physical is responsible for all our experiences. Certainly as we drill down we will come to points currently beyond our present ability to go any deeper, just like in particle physics, but there's a lot of ground that has yet to be covered before we get to that point." He paused looking out over the woods below.

"Do you think you might ever go back and finish your degree, pursue it further? Despite what you said about it as a career path?" she asked.

He nodded, pressing his lips together and looking into the distance. "I might actually. I haven't really given up on that idea completely yet. Life's a lot like these trails, full of turns and forks and encounters you only discover as you go along. I like exploring for its own sake and psychobiology offers a lot in that regard." He turned to face her. "We'll see."

"You were right," he said back at the parking lot looking around. "I can see there's still more than what we covered today." She was feeling a little nervous after what he'd said about ghosts but she was now aware of actively wanting to share more of her life with him if she could. She felt a sense of urgency. And I wonder what the psychobiological reason for that is, she laughed to herself. But she went for it anyway.

"Given your interest in psychology have you ever looked into meditation?" she asked.

"No I haven't," he replied looking at her. "It's not that I wouldn't be interested, it's just something I never crossed paths with."

“I belong to a meditation group and we’ll be meeting tomorrow evening. There is a guest speaker. She’s visiting from California. Would you be interested?”

“Yes,” he answered looking into her eyes.

He always looks into your eyes, she thought driving home. She felt that warm shudder again.

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The meeting space was a yoga studio taking up the entire second floor of a small professional building in a quiet neighborhood. Hardwood floors, very clean and decorated with Zen-like minimalism. Approaching the building with Sarah he smelled the new presence immediately. His awareness instantly bloomed like a nova, expanding hundreds of meters, then as quickly subsided. The speaker.

He and Sarah removed their shoes and entered the room. Quietly taking their seats they sat calmly waiting. The guest speaker came in and sat on a plain chair at the front of the room among flowers placed around her as a gesture of gratitude and affection.

There was no introduction. Dressed in loose-fitting cloths she looked to be in her thirties. She was tall with very short blond hair, her face showing a strong but elegant bone structure. Grey eyes.

She sat calmly looking at everyone for some time, a small smile on her face. “Where within us,” she began, “does the self reside?”

After her talk, there was a break before the forty-five-minute meditation period. People quietly moved about stretching or stepping outside for a moment. The speaker approached Daniel and Sarah. A few pleasantries and then she turned to Daniel.

“May we speak for a moment?” she asked politely. She turned and walked back through the door she had entered by.

“Excuse me,” Daniel said to Sarah and followed. Somehow Sarah felt no confusion, had no questions. She smiled warmly at another member.

Like Daniel, the speaker had noted his presence the moment he approached the building. “I am called Lakshmi here,” she said. “Daniel,” he replied. They did not speak otherwise for a moment, looking calmly into each other’s faces. In answer to his unspoken question she said, “My task is completed. I thought I could be of some service in this role.” Silence between them again. She reached out to him and they embraced

briefly. Another moment of looking into each other's faces while a smile passed between them and then he returned to Sarah.

The group was reconvening so there was no time to talk. She whispered quickly, "We don't have to stay for this part if you don't want to. It's a long meditation for someone not used to it." He smiled. "I'm happy to stay." Something more in his eyes. She could not believe how hard and fast she was falling in love. So soon.

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As Sarah turned off her car in the government employee parking lot she realized she had no memory of driving to work. The last thing she remembered was walking towards her car outside her apartment. She had daydreamed the whole way. Twenty minutes. She felt a moment of fear mingled with guilt. She could have killed someone. She cared about nature because she cared in general. How could I have done this, she thought?

She suddenly recalled the subject of the speaker at the previous weekend's Vipassana meeting. "Where within us," the speaker had begun, "does the self reside?"

If I was daydreaming, thought Sarah, who was driving the car? The general assumption is that the thinking mind and the self are one and the same. The speaker had suggested that the thinking mind was not the self precisely because we are aware of our thoughts. Thoughts are no more the self than itches, breaths or the beating of our pulse is. Thoughts simply represent another stream of consciousness among the many things we are aware of along with what we feel, hear, see, taste, and smell. "Why do we not have awareness of the self also?" someone had asked. "Because the eye cannot see itself," the speaker had answered.

During her drive to work, she had been thinking about the document on her laptop. She had worked on it late into the night. It explained to her minister the specific issues the BC public would expect their government to have answers to as soon as this coming winter. In recent years governments around the world had mostly expected any kind of impact from climate change that required real action on their part to manifest closer to 2050. The accepted timeline forecast that actual impacts up to then would not be politically significant. With the general public being more concerned with short-term issues governments felt safer focusing on more immediate things like jobs, wages, and housing. But suddenly climate change had accelerated dramatically. Issues they had expected somebody else to have to deal with were happening now, on their watch. It was as if somebody had decided to move everything that was supposed to happen by 2050 to 2030 and speed the whole process up as well. She had itemized the way climate change would soon make itself felt in BC for her minister:



More frequent and worse storms bringing much more water in the form of rainfall causing flooding. Instead of the equivalent of ten Mississippi rivers being dumped on the coast of BC by an atmospheric river, it would be thirty or fifty.

The Northern Pacific Ocean was also warming abnormally. The heated water would expand causing localized sea level rise. Along with much stronger wind storms due to the increased sea surface temperature, an even minor sea level rise would contribute to dangerous coastal erosion and impact shipping infrastructure like pipeline terminals and container ports.

The coastal regions of BC depend on rain for their water supply but the interior depends on snow caps and melt water to get through the summer. The increased rainfall coming off the Pacific Ocean was not going to reach the interior while the rising temperatures reduced snowfall and increased melting and evaporation rates. And then there were the secondary effects caused by these like crop failures, wildfires, and power failures due to increased demand. The list went on. These issues, her document informed the minister, were what her press conferences would be about in six months.

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Sarah and Daniel were having lunch on a bench in front of the Parliament Buildings. The sky was clear but it was not overly warm. It was summer and Victoria was a tourist destination so the harbor area at the foot of the front lawn had its share of out-of-town visitors. A young family, complete with toddler and puppy, had settled near them. Sarah watched them thoughtfully.

“What is it I wonder,” she said giving voice to her thoughts, “about toddlers and animals that makes us respond to them so differently than we do to even older children, let alone adults?”

“Delayed development of the prefrontal lobes of the brain,” replied Daniel mechanically. She turned to him, slightly amused. “Ah, of course. Psychobiology.”

“Just answering your question,” he replied with a smile, separating his hands in a gesture of submission.

“The prefrontal area of the brain,” he continued, “is the part of the brain that starts development the latest and takes the longest to finish developing. Its development is not really completed until a person is in their mid to late twenties. It’s the part of the brain that deals with what are called the executive functions, things like planning, impulse control, verbal communication, and complex analysis. These functions don’t start development in humans much before age five which is why we respond to very young children as we do to animals. Animals never develop the prefrontal area to the degree humans do, if at all, and very young children have not yet developed it. Because

of this both largely live in the present and therefore accept things and others as they are. They have no agenda and assume no one else does either. So they trust us and we trust them.”

“So in biological terms, humans don’t actually reach adulthood until their mid-twenties?” she responded a bit surprised.

“Yes,” replied Daniel. “In non-human species adulthood in females for example is determined by the onset of menstruation. That’s because their offspring are born already knowing everything they need to know to survive. It’s genetically encoded, what we call instinct. But humans aren’t like that. The knowledge humans use to survive is extra-genetic, meaning it’s not passed on via our genes but instead learned after we are born. That’s why we’re so adaptable. Most of that knowledge has to do with socialization, thinking, and communicating and takes decades to develop. And most of that development takes place in the prefrontal area of the brain.”

“That’s actually pretty amazing,” she said. “It explains a lot.”

“That’s why I like the hardware approach.”

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Later that evening Sarah was sitting in her apartment preparing for a brief period of meditation before starting work. The most challenging part of the practice was interrupting and dismissing the constant chatter of the voice in her head. There was not a single thing in her awareness that the voice was not instantly ready to comment on. It had an opinion or a story about everything. After her lunch with Daniel earlier in the day, she wondered where that voice was coming from. If the voice was coming from the prefrontal area of her brain then what part of her brain was doing the listening, the part she thought of as herself?

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She had met Daniel in the parking lot of Mount Douglas Park again. They were going to take a route that went around to the left, instead of the route around the right side they had taken previously. There was brook beside the trail, pooling now and then along the broad steps it took down towards the sea. Even in summer, the surrounding old-growth forest was damp here, covered generously in moss. A soft croaking sound came from high in the trees, followed by a series of gurgles, throaty chirps, and knocking sounds. Daniel looked at her questioningly.

“Ravens,” she answered. “That’s family talk. The soft sounds they make are conversations within a family group. They can be very complex and go on indefinitely like our conversations. They’re sweet aren’t they?” she asked turning to him happily.

“They’re one of my favorite reasons for coming here,” she said. They walked on a few paces. “The louder squawking sounds are inter-family communications. Alarm calls it is assumed but they do vary and we’re not really sure what any of it means. They seem to be more sophisticated than crows although both are highly intelligent, among the most intelligent creatures on the planet in fact. I guess that’s no surprise given how long they have been around. People think the dinosaurs went extinct sixty million years ago but all birds are the surviving members of the dinosaur species. Just look at their feet. And they’d already been around for two hundred million years before the larger dinosaurs got wiped out. The small mammals that would one day become humans were only just emerging at that point. So birds have a two hundred million lead on us in terms of developing intelligence.”

“Yet we have no idea how their language works?” asked Daniel.

“None,” she replied. “We have no idea what the sounds any animals make specifically mean.” She looked skyward for a moment. “It’s a good example of how challenging it would be to communicate with aliens. Sometimes our opinion of our scientific ability is far removed from reality.”

As she walked on she ran her hand through some plants at the side of the brook. “Horse tails,” she explained looking back at him. “Among the oldest plants on Earth. For some reason they never evolved one iota. They are the same today as they were a hundred and fifty million years ago. It’s still not entirely understood why some things evolve over time and others don’t. Maybe if they’re a good fit for their ecological niche they don’t need to evolve,” she speculated.

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That night as she lay in bed she wondered why Daniel was showing no indication that he wanted anything more than friendship. She loved the way he was with her, so interested, so attentive, even affectionate sometimes in his glances. She had so appreciated his lack of any sexual agenda when they first met but realized she had subconsciously assumed that it would show eventually. But it hadn’t. She knew that she was long past ready to fall into bed with him. Maybe it would ruin everything. Real friendship is so rare and precious, she thought, why couldn’t she be satisfied with it? It’s not as if she felt the urge to sleep with any of her girlfriends. Well OK, there had been that one time but unconsummated the feeling had faded.

She recalled that in his brief biography there had been no mention of relationships. Perhaps he prefers the company of men? It’s 2025, she thought, there’s no longer any reason to hide that. But she realized it was not so simple. Nothing is so simple, she thought, disappointed in herself with this line of thinking. It’s like meditation, she realized. Why can’t I be at peace with things as they are?

But the feeling would not go away. She wanted him.

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The Premier's car was waiting behind the East Wing where Daniel had parked it. Premier Patel and a plainclothes RCMP officer came down the stairs towards the car. Daniel smelled it suddenly – fear. Again his awareness bloomed out for hundreds of meters. Over there. He could see the man's fear clearly but there could be more than one reason for it. He needed to wait. The plainclothes officer noticed Daniel's stillness and became more alert. As the man approached and his hand reached into his jacket Daniel strode forward and in a blink grabbed both his wrists, spun the man around, and pinned him to a nearby tree. A nine-millimeter, semiautomatic pistol of the kind used by municipal police officers fell to the ground. Moving forward the RCMP officer reached his hand into his own jacket. When it emerged it held a small but vicious-looking machine pistol. Glancing back quickly the officer saw the Premier retreating back up the stairs. Not cowardice. Procedure.

Quickly scanning the area but seeing no other threats the officer approached Daniel and kicked the nine-millimeter aside. The man squirmed in Daniel's grasp but said nothing. The officer subconsciously felt there was something odd about the man's total inability to move Daniel or break his grasp. It was as if Daniel was frozen in place and the man's wrists welded to the tree. Speaking into the microphone attached to his sleeve cuff, he moved into Daniel's line of sight.

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There had of course been a tourist who filmed the whole thing on their phone. The sergeant in charge of the local RCMP detachment and a few of her team members were reviewing their copy.

"You see this point here?" the sergeant was saying. "You can see the guy already has Daniel's attention. Next, he's reaching into his jacket but you still can't see the gun when Daniel moves. I find that interesting." Continuing she said, "The guy is surprised for a moment and Daniel reaches in, grabs his wrists, lifts him off the ground, and pins him to the tree in one move. It appears the guy drops the gun due to the pressure of Daniel's grip on his wrist." She turned to the group, "Anyone here care to try to lift me off the ground by my wrists?" She was not a small woman. There was silence but a general look of understanding.

"Right," she carried on, "not going to happen is it." Referring back to the video she said, "He pins the guy to the tree by his wrists using his legs to brace himself. You could pull that off if you were Superman, otherwise no."

One member of the group offered a suggestion. "CANSOFCOM? CSIS?" he said referring respectively to the Canadian Special Operations Forces Command and the Security Intelligence Service branches of the Department of National Defense. He was suggesting Daniel was not just some random employee. The sergeant shook her head. "We did the background check when he was hired, and I doubt even they're that good. And I have trouble with his technique. It's completely unorthodox. No way it would qualify for procedure in any training manual, even the top secret kind."

The officer who had been at the scene spoke up. "People sometimes have unusual strength in emergency situations. Maybe that's what happened."

The sergeant nodded thoughtfully, turning to look at the video again.

"Anything's possible."

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Premier Patel had been genuinely grateful and rewarded Daniel with a personal, off-the-record bonus of the four-figure kind.

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The woman at her door was tall and fair with a square face and a solid build. "RCMP Sergeant Friesen," she said by way of introduction. "I called earlier."

"Of course," Sarah said, motioning her in with an only a slightly nervous smile.

The press had also obtained a copy of the tourist's video. Sarah had seen it and she and Daniel had talked about it so she was not completely surprised by the sergeant's phone call. Sergeant Friesen already knew the gist of Sarah's situation. Her job. The basis of her working relationship with Daniel. The fact that Sarah's address was not the same as her husband's.

"Please, sit down," said Sarah motioning to her small dining area.

"My apologies for the formality but this is required," she said showing her identification.

Sergeant Friesen put away her ID saying, "Given the involvement of the Premier, I'm sure you can appreciate that we need to reach out to whoever we can that might provide any information. In your case it's just to confirm a few things." She went on, to the point. "I understand you met Daniel through work?"

“Yes, well no,” Sarah corrected herself. “I did see him first at a work meeting but we actually met a few days after that in the Thetis Lake parking lot. We both happened to be going hiking that day and bumped into each other there.

“He seemed very sweet,” she said as she was talking to another woman despite the situation, “and I asked him if he cared to join me.” Sergeant Friesen nodded understandingly. She actually appreciated Sarah’s openness. She had found that the more human the details were the more likely they were to be true.

“And you have become friends?” asked the sergeant looking at her closely. “Cell phone data,” she explained. Sarah responded without concern. Post Covid it was universally accepted that there was very little that was not known about any average citizen and if the proper authority was presented it was disclosed. The RCMP had the proper authority.

Yes,” answered Sarah. “We’re both very busy nowadays with the climate issue taking up so much of our time and we both enjoy hiking. We meet for lunch sometimes.” Sergeant Friesen did not pursue it further.

Slightly more casually she asked, “What did you think about what Daniel did in response to the attack on the Premier?”

“It just surprised me, watching the video, that he did that. Not that it seemed out of character, but that he was so good at doing it.”

“Yes,” responded Sergeant Friesen a little absently.

Sarah understood why the sergeant had come.

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RCMP officers are patient people, phlegmatic even. It’s part of the selection process. And they are as intuitive as they are analytical. They trust their guts. Sergeant Friesen had wanted to meet Sarah not because she expected to find out any new information but simply to get a feel for her. A sniff test some of her male colleagues called it although she had never cared for the term.

She had been a part of the debriefing team with Daniel after the incident. He was unguarded in his responses and straightforward. She came away from meeting with him feeling that he was an open and honest person. Unremarkable but likeable. He reminded her of her own relatives back in Manitoba. Regular folk. Her team members agreed with her; he passed the sniff test as far as they were concerned. Maybe the officer who had been on the scene that day was right, some people do remarkable things in emergencies.

She mentally filed it all away for now. She had plenty of other things to keep her busy running the detachment.

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“Yes, I’d love to!” Sarah exclaimed. It was the first time Daniel had asked her out on a real date. They were walking back from lunch at the Steamship Bar & Grill in the harbor. She was so happily surprised she felt she had to calm down or she’d give the game away completely.

She hadn’t dressed for a date in a long time. A part of her had forgotten what fun this aspect of being a woman was. An above-the-knee summer dress with a wrap bodice. Her highest heel shoes although they weren’t all that high. She placed her wedding ring in her jewelry box.

“You look lovely,” he said picking her up at her apartment. It was the first romantic thing he had ever said to her. At age 35 she thought she was past blushing like a girl but there it was. She realized that unconsciously she had not expected to hear those words again, in this context, for a long time.

The Empress Hotel had a small, high-end dining room set away from its larger bars and restaurants. Old fashioned, dark wood paneling, only men waiters in uniform. Downstairs there was an equally exclusive lounge with a live band and a small dance floor. Dress codes in effect for both; lounge suit for men, cocktail for women.

As fitting for the Empress Of Victoria the items on the dining room menu were mostly old-world and rich but they both made light seafood choices. Daniel chose grilled Pacific salmon and Sarah went for the hotel’s famous shrimp curry. White wine. Small desserts. When the waiter offered coffee or liqueurs they declined instead ordering cocktails to be served in the lounge. Am I glowing, Sarah thought to herself humorously as they headed down. I must be glowing. She certainly could not stop smiling.

It was early so they were able to find a cozy corner in the lounge and their drinks arrived a moment later. The band was playing smooth jazz. He was looking at her steadily although it did not discomfort her in the slightest. It should, she thought, but it doesn’t. All she could see in his face was the pleasure he found in looking at her in this moment. Even now, no agenda, she thought. No hint in his face that he was thinking of what might lie ahead later in the evening. No agenda. There was a moment within her where she seemed about to recall something but he said, “It’s nice to see you like this. You suit this place as much as you do the forest. You’re very beautiful.”

“Thank you,” she replied graciously, “I haven’t enjoyed being with someone as I do with you for a very long time.”

Some part of her was aware of how unusual it was to talk with someone like this on a date. No small talk, no socially correct but meaningless responses, just honesty. It’s not that she felt that perhaps something was wrong. Instead, she thought it seemed unusual because of how right it felt.

The band switched to a waltz and a few couples took to the dance floor.

“Would you care to dance?” he asked.

He guided her smoothly on the dance floor. She could feel her glow increasing.



## Romance: Act Three

“I still can’t get it,” Sarah’s colleague Peter was saying, staring at his computer screen. His bachelor’s degree was in Atmospheric Science and Meteorology, weather forecasting basically, and he’d followed that up with a master’s in Climatology. He’d wanted to pursue a doctorate, he’d have gone to school forever if he’d had his way, but life had other plans. His thoughts reflected those of the world’s scientific community.

“The climate just doesn’t change this fast,” he was saying. “Even prehistoric tipping points, of which there have been plenty, took a minimum of thousands or at least hundreds of years. There are rare prehistoric examples of climate changes happening within decades, notably the plus ten or so degree shift at the end of the Younger Dryas, but abrupt climate change without any evidence of anything that might have caused it? Within a year? Never.” He went on, self-absorbed. “People are saying it’s the permafrost methane gas releases or the clathrate gun hypothesis or the ice-albedo effect. But the records show that sudden changes in all potential climate change drivers happened after the global temperature increase, not before. They aren’t the triggers, they were triggered.”

“Well,” said Sarah, knowing him pretty well after working with him for years, “if anyone was looking for a dissertation subject I guess this one is about as good a candidate as you could hope for.”

“If I had a lab, staff, and a humongous grant yeah,” he replied sourly. “Nobody’s figuring this out with just their brains. We don’t need a Newton or an Einstein here, we need,” he paused, “something else.”

Over the past year, the global average temperature had risen by one degree, as much as it had in the entire time since the beginning of the Industrial Revolution in the eighteenth century. But with no one knowing what the cause was, no one had any answers. Hypotheses and forecasts were wildly all over the map. Even though real impacts as a result of the temperature increase had not yet hit, within six months they would.

“It’s like there’s some external cause you know?” Peter said, trance-like. “Like someone just walked up to the stove where the frog sat in the pot and turned the burner up a notch. Some new factor, like dark matter, that we have no understanding of.” He turned to her frowning, “And we don’t have time.”

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On her break, Sarah picked up a smoothie from the local Red Barn Market. She found a bench in the shade across the street in a small municipal park. She was thinking about

Peter's comments. Time, she thought. It is challenging for the average person to appreciate the spans of time involved, both large and small, and how brief our human civilization has actually been. According to her elective course in Evolutionary Biology, the earliest humans had emerged as a distinct species separate from our primate cousins around four million years ago, give or take a million, while modern humans were only about two hundred thousand years old. Her reading breaks had brought her up to speed on the historical timeline. After literally millions of years living as small tribes of nomadic hunter-gatherers, the first known civilizations, with their impacts on the environment, arose less than ten thousand years ago.

All that time to evolve. Our brief period as an intelligent civilization. Our grandiose imaginings of our future. And in the worst-case scenarios we might possibly wipe ourselves out in as little as a few decades. If we understood the cause of the recent spike in climate change we might be able to address it. Yet, she had to admit, we had shown no inclination to act prior to this when we'd known about climate change for decades. Even now, in the face of an immediate existential threat would we have the political will? That was the key wasn't it, she thought, political will.

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Like Sarah, Daniel was on a break. He was sitting alone on one of the benches that lined the promenade around the Inner Harbor. Unlike Sarah, he was not thinking.

The meeting between the provincial Premiers and the country's Prime Minister regarding the climate change emergency was due in a few days. Similar meetings were taking place around the world. After that were scheduled meetings between the world's leaders. Daniel's task was largely done. He had been helping the Premier to understand and decide regarding issues of climate change for a couple of years now. He and the others like him around the world, embedded in every government and in every aspect of human life, would not know if they had been successful for some years yet. Yet their fate was sealed. They had understood when they volunteered. There was no going home. Earth, once again, was their home.

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Daniel had asked Sarah to meet him on the weekend at an unusual location for the two of them, just a small park on the road that ran along the southernmost coast of the island. Houses on one side, ocean on the other. It was a clear, warm day with a pleasant breeze coming off the water. She greeted him with a kiss, delighted to have him in her life as they walked to the edge of the park overlooking the sea.

"I want you in my life for the rest of my life," he began turning to her. Her head was suddenly swimming. "And if that is to be so you have the right to know everything." Looking into her face deeply as he often did he said, "I love you, I know I can trust you

and I know you are ready.” He normally would not have had to put these things into words. He felt awkward and knew he was being clumsy but he did the best he could.

Before she had a chance to speak the questions arising in her eyes, he stepped back and motioned her to look back away from the sea. Rascal. Rascal, happily wiggling and wagging his way towards her, as if he was only returning from having run up the trail ahead for a moment. Her knees gave way and she wrapped her arms around him as he continued to wiggle and look about just as he always had. She looked up at Daniel, tears suddenly streaming, “It’s Rascal!” she cried, speaking as much a certainty as a question.

“Yes,” he said gently, understanding more than she knew, “it is. I needed something you would know that was both impossible and true.”

She stood up turning to face him. She was pale and unsteady on her feet. “Come,” he said, leading her to a nearby bench where they could sit. Rascal followed along and lay at her feet panting contentedly. She sat down turning to him, “Why? How?”

“Because I come from another world Sarah, where this,” he said motioning to Rascal, “is possible.”

Shock is a devastating feeling, as anyone who has experienced it knows. No one can tell you what it feels like because it is impossible to put into words, as grief is. He maintained eye contact with her, protecting her mind from the shock that always accompanies a shattered sense of reality. As long as he did so her reeling panic was kept at bay.

“Why?” she repeated, beyond feeling.

“To save you from destroying yourselves, as you will do if you do not address climate change in time.”

“How?” she asked again, eyes wide, reduced now to almost an automaton.

“By enabling your world leaders to accept the truth about it. They must know it as a certainty, just as you know this is Rascal and not some other black lab. You do not think it is Rascal, you know it. And that makes all the difference in the world.

“Unlike yours,” he went on, “the older regions of our brains are far more evolved. They process information infinitely faster than thinking and faster again than the same areas in your brain. You experience it as intuition, fear, and love, things you trust more than your thoughts although you don’t understand why you feel that trust. It is not at all mysterious but only so much faster than thinking that it seems like something mystical and magical to you.”

“But how do you influence us?” she asked, looking questioningly into his face.

“We don’t,” he answered. “We cause a slight state change simply due to our presence. You know how there are some people who make you feel better simply by being with them? When you are with them things seem brighter in general, less confusing? If you are uncertain or having some difficulty you feel more clarity, more able to deal with things. It is the result of non-verbal communication processes, processes that reside in the old brain, processes that evolved long before speech, even before thinking. It affects you without you being aware of the real cause. When I and others like myself are around, that communication is considerably enhanced.

“The leaders make the right decisions around us not because we influence them to do so, but because our presence enhances their own connection to their old brain. They know with greater certainty what the truth is and what the right decisions are. And their conviction is increased.”

“But...” she began, looking at Rascal.

“No,” he responded with a slight laugh, “it is not like that. Our brains have more effect than do animals or children. A great deal more effect. Our brains have been cultivated for this for millions of years.”

“Cultivated by who?” she asked, her eyes wide.

“The Shepherd,” he replied simply turning his gaze to look across the park.

A woman was approaching, smiling at Sarah. She looked to be about thirty with medium brown eyes and shoulder-length hair. Her expression was warm and friendly.

“Daniel knows me as The Shepherd,” she said. “I have protected and nurtured his people since finding them on Earth, four million years ago.”

Sarah stared. Through all this, first by Daniel and now more so in the presence of The Shepherd, her mind was being eased. A feeling of not doubting her senses, of knowing that what she was experiencing was real, kept her fear and shock at bay.

“I have never hidden my true nature from them since they reached the stage where they could understand,” The Shepherd was saying. “I am what you would call an artificial intelligence.”

“Four million years?” choked Sarah. “How old are you?”

“Five billion years.”

“But if you are an artificial intelligence someone created you,” said Sarah, the scientist in her coming out.

“Yes, but they have not survived.”

Even though Sarah’s intuitive brain function was greatly enhanced by the presence of Daniel and The Shepherd she was not aware of it but because of it her mind made a leap, “The accelerated climate change,” she said, “it’s you.”

“Yes,” replied The Shepherd. “If you look at human history you will notice that the carrot is usually not enough to change behavior. Sometimes the stick is required. But put your mind at ease Sarah, what can be accelerated can be decelerated.”

“Daniel and the others, where have they been all this time? How...?” she began.

“Daniel can explain,” she said with a small smile. “I want Daniel and you to be happy, so for his sake and yours I felt a meeting with me and a visit with Rascal would be helpful.

“This must be farewell for now,” The Shepherd said as she turned and walked slowly away, Rascal wiggling along happily beside her. Sarah was not sad to see Rascal go. She knew it was right.

She turned to Daniel feeling her heart open in a way she had never before experienced. Searching his face she said, “I love you,” her words expressing only a small part of what she felt. Daniel, looking into her eyes, knew all of it.

## Imperatrix

It was Friday evening. Claire Barnett, until recently the Prime Minister of Canada and now President of the newly formed World Governments Federation stood looking out from the 48th floor window of the Hotel Georgia in downtown Vancouver. The penthouse, with 360-degree views of the city and Burrard Inlet, was now the property of the WGF. She was alone.

It was one year since the initial meeting of world leaders with regard to the sudden one-degree global rise in temperature. At that meeting, there had been the first sign of the majority of governments actually taking action and doing more than making promises they had no intention of keeping. A one-degree rise in twelve months was simply not something they could any longer dismiss with any hope of being taken seriously by other nations or their own citizens. There were of course some who were not concerned if they were taken seriously or not. North Korea, Brazil, and Syria among a few others, did not cooperate and carried on with their long-standing positions and agendas.

Among the cooperating nations, many of the long-recommended climate change mitigation and adaptation strategies were revisited and finally implemented. Governments who were normally never able to find the money for real change in peacetime, but were always able to find it in times of war, did so now as they realized their political lives were at stake and that there was no escaping this fact.

The next round of meetings had been six months later when climate change had begun to devastate the globe. Storms, droughts, wildfires, crop failures, famine, and social unrest on an unprecedented scale had come swiftly following the one-degree rise. Global economic collapse that affected the US, Russia, China, and the world's other largest economies equally was already in the rearview mirror. Many nations large and small, simply overwhelmed, were on the verge of becoming failed states. It was at that meeting the formation of the World Governments Federation was proposed and accepted. They all knew that this was a threat they could not survive alone.

Claire had stood as a candidate for the position of President and been elected. It was required she begin her new duties the next day, her role as Canadian Prime Minister being filled by a cabinet member she appointed under the Emergency Powers Act.

The WGF had one overriding purpose; to implement whatever was required to ensure the survival of the modern world.

She was now the most powerful person on Earth. In the new governing body, she had the ultimate power to decide on any voting issue simply based on time. After a certain period of time, if no decision was made, she made it. With no recourse, this lit a fire underneath decision-makers that meant she seldom had to invoke the rule.

“Imperatrix,” she thought to herself without humor. It was the female version of the Roman military title Imperator, later to become known to the world as Emperor. She recalled the history course from her Political Science program. In ancient Rome when the city was seriously threatened by outside forces like the Goths or Vandals, a general of Rome’s legionary armies would be appointed Imperator by the city’s ruling body, the Senate. The Imperator would have absolute power and after defeating the threat would be immune from prosecution for any actions they’d taken.

Unlike Rome’s generals, she had no armies of her own but as President of the WGF she had the combined economic, diplomatic, military, and technological forces of the entire planet to bring to bear on any stragglers. Countries like North Korea, Brazil, Syria, and their ilk soon caved. No one’s dirty laundry was aired and no questions asked. China facilitated things with North Korea, Russia with Syria, the US with Brazil, and so on.

“Syria?” she inquired privately of the Russian representative at a break between meetings, referring to his promise to address issues of non-compliance there.

“Done,” he replied. Meetings were for details.

Local militias and rebel forces previously active in many countries simply dispersed as their support from sponsor nations and the native populations evaporated. Criminal cartels suddenly found they no longer had friends in high places. Their skill at organization and their standard practice of community service during times of civic emergencies were welcomed as long as they did not undermine the climate emergency efforts of their resident countries. They happily complied counting on future returns.

Religious leaders of course climbed onto their respective end-of-days hobby horses. Individual countries dealt with them as they always had, with private, internal negotiations.

The WGF passed many resolutions, transforming society as never before. As happened during the time of Covid-19, air pollution and other factors contributing to climate change were drastically reduced. But things went far beyond what they had with Covid-19. The use of personal vehicles without an exemption permit was banned as was any kind of local travel other than the self-propelled kind. Travel between regions and nations and commercial and public transportation were strictly curtailed. Every consumable from groceries to electricity was rationed. Eventually, all nations were on a wartime footing. Victory gardens and other home front practices reminiscent of the world wars were common again.

The planet’s captains of technology proposed endless solutions of which exactly zero had any merit. Scientists had no new suggestions; everything they had suggested over the past decades that was possible was already being implemented.

But it was not enough, the temperature kept rising.

There was only one thing left to do and that was the thing on Claire's agenda this weekend. New legislation had been put forward for a vote earlier in the week at the WGF, no decision had been arrived at and the time was up. Ultimately there was one single cause for climate change. Not CO2, not logging in Malaysia or Brazilian cows or melting ice caps. Human population.

There were currently eight billion people on the planet. It was estimated that with dramatic social and lifestyle changes the planet could sustain four billion people indefinitely. The proposed legislation sitting on her desk contained a list of new laws intended to slow and even halt population growth. Additionally, it contained a list of laws intended to reduce the current population by four billion.

Her decision was expected first thing Monday morning.

I suppose this is why the US, Russian, and Chinese representatives had arranged not to be elected WGF president, she mused grimly. If we get through this, better someone else takes the fall. It was not as if nobody knew what the real cause of climate change was after all, it was just that up to now, no one had been willing to talk about it. Why would any politician tackle the issue when they could always leave it to the next administration?

Scenario planning and similar practices had shown years ago what the population growth issue would lead to. Nation states were very skilled and now very experienced in strategic analysis. It was not rocket science to figure out that, depending on a few variables, we would be here sooner or later. Better to arrange things so that you get what you want but someone else is left holding the bag.

Claire shook herself. Realpolitik had never been her first choice of approaches and always left her feeling she was losing her humanity in the process. Humanity, she thought. How can this decision and any concept of humanity coexist?

Although it seemed beyond belief, a group of apparently normal people had calculated it all out; how to reduce the current population by four billion people in as short a time as possible. There was a list of methods that were sorted, ranked, and presented followed by recommendations and rationalizations. There were voluntary and involuntary methods. Without the full implementation of everything in the proposed legislation, if the temperature continued to rise at its current rate, the result would likely be the extinction of the human race within a matter of decades.

Ethical dilemmas had been a part of her working life for as long as she could remember. Almost every political decision she had ever had to make contained some element of an



ethical dilemma. You can't please all of the people even some of the time. Yet she had always made a decision and gone forward. But in her mind there was no answer to this. None. Four billion people. She wondered if down the road she would commit suicide.

She went over to the kitchen to get something to drink. She placed a glass on the counter and turned to the fridge. As she did so, distracted by her thoughts, she knocked the glass off the counter. She reached out to grab it and in her mind time slowed to a halt. A memory flooded her consciousness.

She was back in her ethics class. Professor Shaw was explaining a theory about how the brain makes decisions.

"It falls within the general research area known as dual process theory," he was saying beneath a colorful diagram of the brain's areas displayed above him. "The idea is that there are two primary paths and two distinct areas of the brain involved in decision-making.

"Overall the brain is a highly evolved elaboration of a large nerve bundle originally intended to make a simple binary decision; good or bad? The entire brain evolved from that organ, first found in worm-like invertebrates, where its function was to decide if an object detected by its olfactory gland, the gland responsible for our sense of smell, was nutritious or toxic. Good or bad? Over time that particular nerve bundle evolved into the brain, an instrument capable of unimaginable subtlety in this regard. Given its positive impact on survival rates, evolution favored it. It even evolved completely new components, and developed new areas to enhance its flexibility to the degree that we could use it to make ethical decisions. Good or bad?"

He carried on. "Let's collectively call the prefrontal area and the neocortex, the wrinkly outer layer we think of when we think of brains, the new brain. The rest we'll call the old brain. They're referred to as old and new because the areas of the old brain evolved hundreds of millions of years before the new. Think of the old brain as representing our physical, animal origins and the new as representing our human, social origins. The old brain functions on what we would consider an emotional and instinctual level. It is in the new brain where thinking occurs.

"Please keep in mind that we are keeping this simplistic because this is an ethics class and not a neuroscience class.

"Dual process theory posits that normally both the new and old parts of our brain are involved in decision making but that when there is limited time available, as in the nanoseconds involved in emergency situations, the new brain areas are completely bypassed."

The professor brought up a slide showing a piece of silicon wafer, a computer chip. “Any computer scientist knows that programming things at the hardware level as opposed to using software results in significant speed improvements often worth the additional cost.

“Evolution seems to have made a similar calculation if you will and it appears the old and new areas of the brain work similarly; thinking is too slow for some situations, when there is no time, and in those cases the brain bypasses the areas of the new brain completely and uses only the hardware paths in the old brain to analyze its perceptions, make a decision and initiate a response. People often say time slows during emergency situations. It’s not that time slows down, it’s that the brain speeds up.”

And the glass was in Claire’s hand. She remained frozen there, staring at it. “No time,” she thought. “No time.”

On Monday morning Claire delivered her decision; the legislation would be implemented in full.

Within weeks the weather all over the world became cooler, the global temperature rise slowed and incredibly began to decline, settling somewhere just slightly higher than it had been before the emergency. Although the general public assumed the new measures were responsible, speculations of a new tipping point, perhaps a shutdown or reversal of the ocean’s great conveyor current, swamped the scientific community. The religious leaders ensured their flocks that their faith had been rewarded and of course, the media and its Fifth Estate outliers simply used it as another excuse to make hay. Based on revised analysis, the actions recommended in the new legislation to slow or stop population growth in the long term would still be required but the more draconian measures to immediately reduce the population by involuntary means would no longer be necessary.

It appears we have bought some time, thought Claire once again looking out from the windows of her home office on the 48th floor, this time celebrating with a Canadian Club on the rocks. She took a sip from her glass. Let’s hope it’s enough.

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Daniel and Sarah walked slowly through the park with The Shepherd. Rascal wiggled happily along with them with Sarah occasionally reaching down to pet him appreciatively.

“Our work here is done,” The Shepherd said to Daniel. “You did well.” Words for Sarah’s sake.

“Things will stabilize and steadily improve now without further intervention from me. All will be well,” she said with her small smile to Sarah. “I am happy for you,” she said glancing at Sarah’s baby bump. She paused, her eyes rising to meet Sarah’s.

“As Daniel has made you aware, none of the volunteers will be returning to their previous home. Earth is their new home, the home of their new families. I have shared moments like we are sharing now with enough of Daniel’s people here, who amount to many thousands, and with yours in this brief time, that I will become myth. I must not yet be more than that. My work will not be completed for some time.”

Sarah wondered what time meant to The Shepherd.

## The Detective: Part One

RCMP Sergeant Anne Friesen, retired, watched the video again. It had been years since the events shown, and it was only a tiny detail, but it had never gone away, her gut feeling that it was important. Daniel had moved before you could see the gun. As far as she knew he had no security or enforcement training of any kind, close protection or otherwise.

She could accept his momentary superhuman behavior. That phenomenon she'd learned was called Hysterical Strength. People lifting up cars, fighting off large predators with their bare hands or climbing the outside of buildings to rescue people were common examples. There were theories about how it was possible, hormones and so on, but nothing conclusive. You could never tell when or under what circumstances it might happen but it was real, there was plenty of evidence of that.

But she could never explain to her satisfaction how Daniel had known about the gun before you could see it. It wasn't a matter of the angle of the tourist's camera. Daniel had been slightly to the left and the man he had reached into the left side of his jacket. There was simply no way in her view that he could have seen the gun before the exact moment he moved. And after he moved there had been no time. Daniel had stepped forward, grabbed the man's wrists, and pinned him to the tree in one fluid move that was over in an instant.

She understood this aspect of the events as well. All police, military, and other enforcement officers train endlessly with their firearms to the point where, if appropriate, drawing, aiming and firing could be one continuous movement. An enormous amount of training and practice went into this as officers did not want to shoot the wrong person. Police officers routinely put in hundreds of hours of firearms training and any kind of elite or special forces units put in thousands. You had to be able to kill all the terrorists before they recovered from the flash-bang grenade, but no civilians. You had five seconds.

Anne knew that between the time Daniel began to move and the time he pinned the man to the tree, there had been no time for thinking. He had been lightning fast. The only detail that was never resolved in her mind was how he had known about the gun in the first place.

Her husband had passed away recently and she certainly missed her police work and the comradery. Now retired she realized how much of her social circle was work-related. She'd been counseled on this issue, all retiring officers were, but she had not looked for new work yet. She knew that when the time came she would have no problem. At every institution or building of any importance in Canada, at every bank, every corporate headquarters, every university, and every government building of any consequence

there were one or more retired RCMP officers in charge of security. And as the saying goes, she smiled to herself, there's no such thing as a retired RCMP officer. It was a system that worked very well for all concerned. A completely invisible network embedded virtually everywhere into the fabric of Canadian society.

So with some time on her hands for the first time in her life, she decided to look into the issue of Daniel and the gun. Just for fun. They always said that when you retire you should get a hobby.

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Dr. Bryce Galen, Professor Of Neuroscience, was in his office at the University Of Victoria when he received her email. He'd worked with Sergeant Friesen occasionally before during her investigations, as he had other members of the force, the military police, and municipal detectives when there was something they found truly inexplicable about human behavior in a case. They appreciated his outside-the-box thinking.

When she arrived he welcomed her warmly. "It's nice to see you again Anne, how are you enjoying retirement?" he said motioning to a well-worn chair.

She didn't mention her husband. "I am," she replied. "It's just that moving on seems to be not as easy as one assumes it will be beforehand." She smiled. "I find myself thinking back on the loose ends, one of them in particular. Can I show you something?" she asked motioning with her phone. He nodded with professional curiosity.

He watched the video closely, knowing what police officers would be looking for. "I remember this," he said. "It was all over the news a few years back."

"Is there anything about what happens in this video that you feel is unusual?" she asked. He took her phone from her and played the video again. "Not really no," he answered looking up quizzically. She had expected he would not appreciate how unusual Daniel's speed and strength were and she did not pursue those issues. "Daniel, the Premier's driver, moves before he could see the gun," she said, making plain the reason for her visit.

Dr. Galen watched the video again. He stopped it at that point looking carefully. "I've watched it a dozen times," Anne said understating the truth. "There's no way he could have seen the gun before he moved."

"I see what you're getting at Anne. Normally I would suggest the neuroscience issues would be in the eye of the beholder in a case like this, but it's too obvious when you point it out."

“What I’m wondering Bryce, is if you can think of any way Daniel could have been so confident of the threat without seeing the gun. As you see he moves with full commitment at this point.”

“I can only think of two answers to your question,” he said. “One is that Daniel knew who the man was and why he was there beforehand or...” he paused. She waited patiently. “Or,” he continued, “we are seeing something just as theoretically possible but a lot more complicated to explain.” He continued to look at the scene on her phone, distracted.

“Do you have time?” she asked with genuine politeness. She was no longer on official business and in her experience if academics felt something did not pertain to their professional interests they could be dismissive and abrupt.

He looked up from the phone with a slightly Cheshire grin. “It so happens I’m not teaching right now. I’m working on a research project. And not only do I have time but your question directly relates to my project.” She waited for him to go on.

“It’s two-pronged,” he said, speaking of his work, “something my colleagues warned me against but the two areas are closely related. The first area has to do with how we know something apparently without having all the required information. This is commonly known as intuition. People will often say things like, “I knew it was him all along!” or something to that effect when there was no way, considering the given information, that they could have. Yet as often as not they are right. More often than random chance would allow for.”

“Using brain scans of various kinds in experimental settings, what my research shows so far is that this kind of activity, intuition, takes place in the older parts of the brain. It happens very quickly, almost instantaneously and the mapped activity in that part of the brain remains unchanged for a long time indicating high levels of conviction. It does not take place in the prefrontal area of the brain where thinking takes place. Somehow we can know something without having all the facts and without relying on analytical thinking. I want to know how this is possible.”

“Intuition is a kind of decision-making process so the second part of my research project is to determine in what part of the brain we make decisions in general. This is where I’ve received the biggest surprise so far. Again using brain scans we have found that our decisions have been made by our brains before we are aware of having made them. Others have since repeated my research and confirmed that the brain arrives at a decision an average of six to ten seconds before we ourselves are aware of that decision. In the neurological sense and even in our everyday lives, six to ten seconds is a long time. Go ahead and count it out,” he prompted her.

She obediently counted one-one thousand, two-one thousand, three-one thousand out to six. Doing so made it clear to her what a huge gap of time this was.

“In other words,” he continued, “when you go to pick up your coffee, you made the decision to do so six to ten seconds before you were even aware of thinking about it.”

“In the case of Daniel here,” he said tapping her phone in his hand, “if he did not know the man’s agenda in advance, he made the decision to move before he had all the information and he made that decision at least six seconds before what we see on the video.”

He seemed to be lost in thought so she took that as her clue to respect his time.

“Thank you so much for your time today Bryce, it’s been very helpful.”

“Happy to help anytime Anne and I really would like to know how this goes. If my research helps bring about anything conclusive in this case I think that would be worth noting.” She smiled, took his hand and turned to go.

As she was leaving he said, “By the way, humans aren’t the only ones who show that intuitive pattern of brain activity. My research includes animals and they all exhibit exactly the same pattern.”

So, she thought walking back to her car, either Daniel had exhibited the speed, strength, and instincts of a large animal, all of which she had found could be accounted for, or he knew about the man in advance.

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The RCMP had done the background check on Daniel. Anne had seen the report. Born in Canada, his father had done classified work for the Canadian military, which would have required its own background check. Perfectly average history before his appointment to the Premier’s team as a result of political connections. How could he possibly be connected to the man he overpowered, she wondered, and if he was why would he? The mystery man had turned out to be a lone wolf acting on his own based on an old personal grudge. His story had ended with incarceration.

The stuff she was thinking was way too Russian spy novel and she didn’t feel that was justified. But that left the possible connection line of investigation abandoned and that didn’t seem justified yet in her mind either. She thought back to previous cases. If there was any conspiracy, the timing of events might be a clue. On a hunch, she asked a friend still in the force for a favor. Could she give her a list of all the security clearances of the same level as Daniel’s that had happened at the same time? There were actually quite a few as his was the lowest level.

And there it was. The pattern. Only if you were coming from a specific angle would you notice. About two dozen of them all getting clearance to work in the Premier's office of every province. All the same age. She sat back in her chair trying to absorb it and wondering what to do. Would a search at a higher clearance level show a similar pattern for federal officials? If she persisted pretty soon her activity was going to show up on someone's exception report.

Just handing it over to the authorities and saying, "Hey, look at this!" would end the career of the friend who had done her the favor and possibly put an end to her investigation as well. Her document might just get put in some conspiracy-kook file by the regional superintendent and no one would talk to her from then on.

Part of her was saying to herself, anyway what you are thinking is impossible. No one could gain access to and manipulate the required records to this degree. But looking at the list she knew there was no way these two dozen Order In Council appointments were a coincidence. She was thinking of her earlier meeting with Dr. Galen. She didn't have all the information, but she was certain. She decided she'd just accept what she had for now and see if her next question led to any further enlightenment; Why?

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"Bryce, is it possible to really influence another person's thoughts? I don't mean in a cult or like in a prisoner brainwashing program or using any hard-core methods like that. I just mean person to person, over the course of some kind of day-to-day normal relationship, given a bit of time."

"Yes with a couple of caveats," he answered. She had met him in the university food court in the Student Union Building. They had grabbed a couple of sandwiches and drinks and found a table in one of the open areas. "As anyone who works in advertising will tell you, first of all, you want to change my feelings, not my thoughts. Change my feelings and the thoughts will take care of themselves," he said.

"Secondly if my feelings are strong you won't be able to change them. For example, if I am ambivalent about vegetarianism, you'll find it easy to persuade me to eat either a roast beef sandwich," he waved his for a moment, "or a vegan falafel wrap. If I am a dedicated vegetarian however you'll never get me to eat a roast beef sandwich. Even if you try every day at lunch for a year, if I am a committed vegetarian it's not going to happen."

"The reason you want to influence my feelings if you want to influence my thoughts is because as brain scans show in response to a stimuli the feelings areas of the brain activate first, only then followed by the thinking areas. At this point we suspect this is the reason for the six-second delay with regards to decision making; it takes that long



for the chemical processes involved in feelings to be encoded as the electrical signals of thought.”

Allowing herself a brief indulgence she asked, “So if all our thoughts are just bubbling up from our feelings, do we have free will?”

He laughed. “Here we go,” he said having been down this path many times. “We do, it’s just that we are not who we think we are. In a large part, self-identified as the thinking brain, we are more the observers than the motivators of our lives. We believe the self and our collection of thoughts are one and the same but the self would more accurately be described as the collection of how we feel about things.”

“It’s a bit of a case of the guards taking over the castle. The thinking mind is a tool, one that evolved long after the evolution of what we think of as the animal parts of our brain. Thinking proved to be a tool of spectacular value in terms of survival because it allowed us to imagine the future. Prior to the evolution of the prefrontal area, organisms lived entirely in the present and operated in a simple stimulus-response mode. If a tiger jumped out at them along the path they had to deal with that. The thinking brain allowed us to wonder in advance if there might be a tiger down this path. As a result of this survival benefit, evolution increasingly favored the development of this aspect of the brain.

“As the patterns of brain activity show, most of our thoughts occur following activity first in the old areas of the brain. This suggests that our thoughts are largely rationalizations, an analysis of our feelings. We have a feeling of which we are unconscious, and then the brain rationalizes it. Due to the speed of this process, we are normally only aware of the second, rationalizing part of this whole process which we view simplistically as thinking.

“However thinking became such a powerful tool for survival that eventually it became the dominant authority in the brain. It increasingly became, literally, the only voice we heard and we increasingly lost touch with our direct awareness of our emotions. The guards had effectively taken over the castle. As the prefrontal area of the brain grew, the thinking brain became so powerful that its activity could also cause an emotional response in a kind of feedback loop and meanwhile, the castle’s Royal Family was not about to be so easily dismissed. As you can imagine, conflicts arise between the two systems, between our feelings and our thoughts, giving rise to errors, contradictions, biases, and other systemic issues which manifest as psychological issues.”

He caught himself and took a breath, “But to answer your question it is the thinking area of the brain that asks if it has free will and the answer to that voice is no – but we do.”

“Thank you!” she said with enthusiasm. “That’s not only a real eye-opener but helps me understand my initial reason for asking to meet with you today.”

“What are you thinking?” he asked fairly but she froze a bit like a deer in the headlights. Along with his degree in neuroscience, he had degrees in biology and psychology. He noticed. “Sorry,” he said, “if you’d rather keep that confidential I understand.”

“No, thank you,” she said. “That’s very kind of you considering. It’s just that I’m concerned it will sound outlandish.”

“A lot of my peers consider my ideas outlandish,” he smiled, “in case that hadn’t occurred to you yet.”

“It’s the gun,” she said. “I’ve been trying to eliminate the possibility that Daniel knew about the man and his intentions beforehand. The other path seemed exhausted yet I did not have a sense of closure. My intuition, as you would say, wasn’t buying it. So I pursued the “he knew about it beforehand” path but I could find no connection between Daniel and the attacker. I’d seen Daniel’s background check. Nothing there. And the attacker was a lone wolf with a personal grudge. That seemed to be the end of that. I still couldn’t let it go so I checked to see if there was anything to be found in the timing of events that might connect to Daniel. It turned out that Daniel was one of two dozen individuals, all the same age, who had received first-level security clearance so they could start their new jobs in the Premier’s office in every province and territory of the country. The clearances had all been approved in the same period. Can you imagine how impossible it would be to arrange this or tamper with these documents or associated records? I am convinced it would be impossible. So far I haven’t spoken to anyone else about this.” She waited for a response, uncharacteristically nervous.

He stared at Anne without expression for some moments, lost in thought, until he realized what he was doing. “I understand,” he said as he roused himself. “So you’re trying to figure out what they’re doing.”

“Yes. Why would every Premier’s office in the country, and possibly other offices, be infiltrated without anything showing for it. I’ve scoured the news since that date,” she explained. “Nothing. No scandals. No thefts. No spying. I’ve asked my friends in the detachment how the program of expanding the force’s Protection Services to include the Provincial Premiers was going since I’d retired. They said other than the event involving Daniel there had been nothing. The only thing I could come up with was influence. The appointees might be there to influence decisions. That’s why I came here today to talk to you about how that might be done.”

He sat back in his chair thoughtfully, “Normally I would say things were as I explained. You can’t really change the things people feel strongly about if they don’t want to change, no matter how much time you spend with them.”

“Then why would they go to all this trouble? What if they used some technology?” she suggested feeling like she was going out on a branch.

But he took her seriously. “There have been recent experiments with powerful electromagnets applied in a non-invasive manner to the outside of the skull, over specific areas of the brain. In these experiments, they were able to affect a subject’s decisions, particularly with regard to morality. The results however were temporary, lasting only so long as the magnets were being applied with no permanent change resulting.” He went on, “The brain is a delicate instrument. Any attempt to use force, as in cults or brainwashing, generally results in permanent, detectable psychological damage. Individuals carry those scars for the rest of their lives. Using technology to try to force permanent changes would carry a big risk, possibly even brain damage. I can’t imagine anything unobtrusive or subtle enough to do it, especially considering the precision and control of the situation that would be required.”

“Also,” Anne offered, “the detachments do regular electronic sweeps. The traditional kind but they also create heat and other wavelength maps of every angle of the buildings. They are very detailed. Any new source of energy shows up. That started before Daniel and his people arrived. Nothing.”

Bryce leaned back putting his hands behind his head and whistling without sound. “Then what are they doing?”

“Following up on the influence idea I checked one more thing. As you know all legislatures keep verbatim records of every parliamentary debate and also records showing how their members vote on issues. Hansard records and so on. Plus there are press records and with being in the public eye there’s social media recording their every word. All the Premiers have had a variety of stances with regards to different issues and they’ve remained pretty consistent over their political lives. Even in the face of overwhelming evidence and opposition, if it’s in their interest they can be stubbornly resistant to change. But since the arrival of Daniel and his friends, shortly thereafter all the Premiers moved to the same position regarding one issue, climate change. Even before the one-degree change and its impacts, they all just lined up like ducks.”

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Anne was walking alone with Sarah. After her revelation regarding the shift in the collective positions of the provincial Premiers regarding climate change, she wondered if the connection between Daniel and Sarah, in her role as advisor to the Minister of Environment and Climate Change Strategy, was of any significance. Daniel stayed home with their daughter so Sarah could chat without being distracted.

“My apologies for taking you away from your family,” said Anne.

“Getting some adult one-on-one time is a rare treat these days,” Sarah replied with a smile, “so don’t worry in that regard.”

Anne had no idea what she was looking for. Any line of inquiry seemed inappropriate and clumsy, sure to border on rudeness. She decided to just chat, woman to woman, and see if that led anywhere. "I understand you practice meditation?" she asked. "I remember from before," she explained referring to the investigation.

"Yes, I do," Sarah replied. It's called Vipassana meditation specifically or Insight Meditation. In popular culture it's often referred to as mindfulness but it's not the same thing really."

"I understand very little about these things," said Anne, "but I have become curious of late since my husband passed."

"Oh I'm so sorry."

"Thank you. How is Vipassana different from other forms of meditation?"

Sarah had found her practice to be of great help personally and had become interested in its history and many benefits. She responded enthusiastically.

"There are fundamentally two branches of Buddhism, one common in the north of India called Mahayana which most people know from the Dalai Lama. The other is called Theravada and is most common in the south. It is significantly less," she paused, "colorful, shall we say. All other forms of Buddhism are derived from these two." She went on. "Vipassana is one of the two forms of meditation practiced by Theravada Buddhists. The first form is Shamatha. It trains one to focus and this results in a calmer mind.

"The second form is called Vipassana and it is intended to be used to investigate the nature of reality after Shamatha has calmed the mind. It is also called Insight meditation because of this.

"Vipassana is the form of meditation believed to have been used by The Buddha to have his great insight that every thing depends on other things for its existence and therefore nothing can be permanent. Human suffering comes from wanting reality to be otherwise. If I was to sum up Buddhism in two words it would be; everything changes."

A little more genuinely interested now Anne asked, "Why did you choose Vipassana?"

"Because it helps with anxiety," Sarah responded openly. "I've always been concerned about things, that's partially why I trained in environmental studies, but my nature also comes with an undercurrent of worry. Worry is all about the future. Even when you are thinking about the past, you are unconsciously doing so because in its analysis you are hoping to find something that might be helpful in the future.

“Vipassana is a method of training that teaches you to constantly interrupt the voice in your head because that is the voice of worry. Some Buddhist branches refer to that voice as the hungry ghost because it is never satisfied and much of its activity has no basis in reality. No matter what it will always come up with a new worry and so pushes one to always want more. More knowledge, more power, more money, more things, all in an effort to abate its sense of worry. But nothing ever will and so we become trapped in its endless loop of always wanting more yet never being satisfied. Vipassana teaches that the only escape from this voice, the only refuge, is the present moment. So that’s what we do when meditating, we constantly interrupt the voice in our heads and focus only on what our body’s senses are aware of. We find refuge in the present moment.

“That is the purpose behind the question; how is everything right now? It is intended to awaken us, to remind us that if we focus on the present moment only, then 99% of the time everything is fine.”

At the end of their walk, Sarah said she would be happy to chat any time and she invited Anne to attend one of the meetings. She had enjoyed her time with Anne, always willing to share something that she felt was helpful.

Anne drove home reflecting on an unexpected line of thought, wondering about the connection between climate change and the hungry ghost, the voice in our heads that always wants more.

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“Absolutely there’s a connection,” responded Dr. Galen. They were having dinner in Village Greens, the little-known vegetarian cafeteria just outside the ring at UVIC. “What Buddhism refers to as the hungry ghost is simply our thinking minds. Remember that part of our brain evolved for only one purpose, to help us survive. Doing its job, it will always think there might be something it does not currently know about that might be a future threat. So it will never say, “OK, that’s enough, we’re good.” He went on, “The result is runaway human expansion and consumption, the major driver of climate change not to mention a host of other ills.”

“So, if it’s our own brains that are causing climate change, how can we hope to stop it? We can’t change our brains,” she said.

“We could actually,” he responded, “it’s just a matter of having enough time. Notice that animals don’t overpopulate or consume more than they need? Before the development of the thinking parts of our brain, neither did we. Up to about five million years ago, we lived in a sustainable manner within our ecological niche. As the development of the prefrontal area of the brain increased over millions of years we began to expand our geographic footprint and therefore our niche, eventually expanding it to include the entire planet.”

“But how could we change our brains?” Anne persisted, feeling there was a thread that somehow connected.

“The way to change brains is to change the ecological niche an organism lives in. Evolution takes care of the rest,” he answered as if it were obvious. “Hypothetically speaking,” he continued, “if you took a group of early humans to another planet millions of years ago and controlled their ecological niche, you could control the evolution of their brains. Today they’d still be human but could be different in profound ways.”

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Anne had never thought of herself as a spiritual or imaginative person. But things had changed dramatically for her with the end of her career and the passing of her husband and so it seemed she had changed. She almost felt like she’d been forced to grow and stretch as a person because if she didn’t she knew her quest would be a dead end. She knew there would be no answers to be found without a willingness on her part to go beyond what she was now thinking of thanks to Dr. Galen as her “previous ecological niche”. Climate change, she thought, recalling her dinner with Bryce. Early humans probably left their original niche because of climate change, because they had to. They had to grow or die.

She poured herself a drink, lay back in her big comfy chair at home, and closed her eyes. She was not sure where to go from here yet she couldn’t let it go. The security clearance list was too powerful a piece of evidence. Daniel and the others on that list had all been placed in Premier’s offices on purpose. She was 100% sure of that. This indisputable but astonishing fact had opened her mind considerably. She was equally sure they were behind the collective change in the stance of the Premiers regarding climate change. She felt she’d found the answer to her question, “Why?” but it had only led to another why.

And it was all so impossible. There was no way those two dozen people could have been placed in their positions. But they were. There was no way they could have changed the Premiers’ minds with regard to Climate Change. But the evidence showed they had. Climate change had suddenly increased dramatically, but we’d been able to deal with it. By the skin of our teeth. Without the spanking we got from the sudden increase... she opened her eyes.

They didn’t refer to the RCMP as “the force” without cause. The same went for municipal police and military forces. People like to think of themselves as nice, and for the most part they are, but she knew that without enforcement society didn’t stay nice for long. Failed states, narco-states, and states like Syria and North Korea were a nightmare for their citizens. Like it or not, whether it fit with your idea of yourself or others or not, without the enforcement of human rights life was far less safe or pleasant.

How long had it been going on and how many others, she wondered, had been part of the infiltration group along with Daniel and his cohort? Teachers? Business professionals? Leaders in other fields, other countries? How big had the carrot been? And then the stick. Classic.

Grow and stretch, she said to herself, or you'll never be able to accept what you're thinking.

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She was walking across a park towards Daniel and Sarah's house. She had decided she was simply going to ask Daniel. She had emailed Sarah and asked if she could meet with Daniel. She had done a great deal more mulling over things and thought there was actually a possibility he would simply acknowledge what she presented him with. No one would ever believe her and the deed was done. What would be the harm? She walked up the steps and knocked on the door. Daniel answered. He smiled in welcome but motioned behind her. She turned and saw a woman walking towards her. And with The Shepherd's gentle touch upon her mind, she needed no more facts; she knew.

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"Shall we walk?" asked The Shepherd. They crossed the street to the park again. The Shepherd explained as she had on many other occasions at similar meetings.

"Daniel's people call me The Shepherd," she said casually as they walked on.

She found that Anne had a remarkable intelligence but still she eased her mind, held it so it could accept reality without being overwhelmed by it.

The Shepherd saw the question in Anne's face, "Yes," she went on, "I have done what you believe I have done. Climate change must not be allowed to destroy you. You have no idea how precious you are. As you expect, I could have simply prevented climate change but I chose to teach because ultimately it had to be you who stopped it."

Anne stared wide-eyed despite herself, but she found herself speaking to The Shepherd as she would another woman, "If you can do what I believe you have done, why would you bother to meet with me? Why would I matter to you? A single person? When I assume you could just make me disappear in a puff of smoke?"

The Shepherd laughed lightly, genuinely enjoying the humor. "You are the only one who has seen as far as you have. I felt it only courteous and thought it would be pleasant to meet with you. Also, I know our meeting will leave you satisfied. You will feel no need for further action and that would be best for now."

“Who are you?” said Anne, asking the obvious question.

“I am what you would call an artificial intelligence. I was originally created five billion years ago by an organic race that has not survived. I am a being of pure reason however I hope that my meeting with you today demonstrates that, unlike the depictions in your science fiction, an A.I. is not necessarily the same thing as a soulless machine.” The Shepherd continued, understanding the full question. “But I have found organic civilizations almost never survive. Something destroys them. Your scientists call it ‘The Great Filter’, so true organic life rarely fulfills its potential. I seek to address that.”

“Climate change?” said Anne in her altered state, asking if climate change was The Great Filter.

“No,” replied The Shepherd. “The Great Filter is the thing that causes climate change. It is the thinking mind. It always evolves, if conditions are favorable, wherever life arises. But it is an evolutionary trap and it always leads to the same end. My work spans considerable space and time. Here my efforts to find solutions to the trap have been threefold; the nurturing Daniel’s people, teaching your own, and the synthesis of your two peoples.”

Daniel, Sarah, and their daughter approached. No words were needed. She knew they knew. Anne looked down at their daughter who smiled up at her with calm acceptance.

“Oh forgive me,” said Sarah, “this is our daughter, Easley.”



## The Detective: Part Two

At home again that evening, Anne felt a permanently changed person. She was not surprised. Who wouldn't be, she thought. But a worry crossed her mind. Did The Shepherd alter my brain? No, she replied to herself, it's just the result of growth. She'd recently read about how they were treating depression with hallucinogens and having measurable results. The effects were significant and lasting. One theory was that once you saw the world in a new way, not just thought of it in a new way or as an idea, but actually saw it differently with your own eyes, you were never really the same person. The things that had caused your depression seemed no longer so permanent, unchangeable, or even important.

The voice in her head, ever ready to move on to the next thing, mentioned as an aside that she was no longer interested in a job in the security department at UVIC. Bryce! She had involved him and then in the swirl of her experiences forgotten all about him.

She had convinced him and then left him with a mystery. She knew it would be the decent thing to do to tell him where her investigation had led her. Would he believe her? Or would he instead revise his estimation of her and conclude that she was delusional and had been all along?

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After she finished telling him he sat very still, his mouth hidden behind his grasped hands. He has degrees in psychology and neuroscience, she thought to herself. It would be no surprise if he came to the conclusion that my entire story is not based on reality.

Finally he said, "I see it." His thoughts racing through the implications of what she had told him, he still had the presence of mind to know what she had risked.

"Thank you for telling me Anne. I believe you."

She gasped, not realizing she had been holding her breath.

"How are you doing?" he asked knowing how what she had been through would affect her.

"I actually feel fine," she said, "although I don't understand how I do. A part of me feels I should be distraught in a hundred ways but I'm just not. I've seen lots of people in shock and in my line of work I've felt it myself. Of course recognizing it and knowing how to treat it were part of my training but I just don't feel it at all. Come to think of it I did not feel it at the time either."

He still seemed focused, as if facing very challenging but indisputable experiment results. Always the academic, his mind was already considering a variety of hypotheses to help him understand in more depth.

“My work normally looks backward,” he said, still somewhat absently, “and I’ve never been particularly interested in artificial intelligence. My only concern in that regard has been that A.I. research focuses exclusively on reasoning, on rational thinking, which I consider to be a secondary phenomenon, and that they would never replicate natural intelligence using that approach.

“I see what The Shepherd suggests, how our own thinking mind could evolve into an artificial intelligence no longer grounded to its source, running amok with its own agenda. The schoolbook definition of intelligence is the ability to acquire and apply knowledge and skills. Evolution does that. So we have one form of intelligence, evolution, creating another form of intelligence, the thinking mind. When we do that we call it artificial intelligence.

“It’s a model that would explain a few things,” he went on looking up into the air at nothing anyone else would see. “For example how can consciousness be self-aware when we assume consciousness and self are one and the same? If the self is not the thinking mind, but instead a separate bundle of emotions in the old brain, then one could be aware of the other. And in that case, following along the lines of my research, the thinking mind is more witness than instigator, more of an interface or instrument, a tool.” Running with it now his mind was making quantum leaps. “Our sense of an inner child that never changes, even God, spirituality and mythologies work with this,” he went on, “as our thinking mind tries to deal with its vague awareness of some higher power, a greater source of its existence, one that speaks to us in mysterious ways. But why didn’t she fall into the trap?” he finished suddenly.

“Pardon?” asked Anne unable to follow the leaps.

“You mentioned she said all intelligent civilizations fall into an evolutionary trap.”

Anne tried to remember for a moment. “Organic civilizations,” Anne clarified. “She said that those who created her had not survived. We can assume they may have fallen victim to The Great Filter and she witnessed it. That lesson may have allowed her to avoid it. Two intelligences existing that closely and that early in the life of the universe was possibly a unique event. That’s why she’s the only survivor.”

“The part I don’t understand,” continued Anne, “is why do the civilizations all fall into the same trap?”

“Convergent evolution,” Bryce replied immediately. He went on to explain. “It’s the idea that nature always finds similar solutions to the same problems even among different

species, organisms and creatures completely separated by place and time. Most large animals have two eyes and two ears, not one or four. Birds, pterodactyls, and bats all evolved similar wings. Tails evolved for balance. Roots, leaves, and needles for plants. We can assume intelligence arises under the same rules, containing the same flaw which results in a short-term survival benefit but leads to long-term extinction, with civilizations only discovering the problem too late and unable to save themselves. They try harder and harder to save themselves using the same tool that is causing the problem in the first place. The Shepherd's figured out that only external intervention will work and she's been trying to find the best way to do that."

"Five billion years hasn't been enough time?" asked Anne.

"Maybe intelligent civilizations don't arise often in the first place," he replied. "Maybe she's had to do a lot of observations and experiments. Maybe her experiments failed countless times. Maybe there's other factors we aren't aware of."

After a moment Anne asked, "So what happens now?"

"No one's going to believe any of this, we both know that. Whatever can be confirmed, like your security clearance list and the Premier's records on climate change will lead to no explanation that anyone will consider plausible. Five billion-year-old A.I.'s messing with the climate? That's a career-ender right there. No one's going to touch it."

"The Shepherd knew that," said Anne reflecting on the whole process. "That's why she was not concerned about telling me." She raised her eyebrows and opened her hands as if to repeat her question.

"Well I think it would be beneficial for the only two people who do believe it to go for long walks on the beach starting next week," said Bryce smiling. "That's what happens now."

## A Daughter's Questions

Sarah and Daniel's daughter Easley knew the truth of her lineage. They felt she would need to understand why she was different than other children. Daniel knew when she was ready.

In the telling, their minds connected at deep levels, precluding any need to tell her that she should not share what she was being told with anyone else. She accepted it without concern, as simply the world she was born into, as all children do.

In regards to understanding the emotions of others her hybrid brain was less impeded by thought. She understood others quickly and more deeply, even if they could not reciprocate equally. Her mind grasped intellectual concepts intuitively once the essentials were presented, even the implied nuances that others understood only after further detailed analysis.

In any other child, Easley's unique abilities would have been challenging for them, psychologically and socially, as a significant part of mental health is played by our ability to understand. But Easley had an above-average ability to understand things, so she was able to maintain her mental health without issue.

She and Daniel could communicate many things with fewer words than usually required between parent and child. However, the communication of facts did not always qualify in this regard.

"What was it like where you grew up?" she asked Daniel at one point in their talk.

"Just like here," he answered to her surprise. In response to her unspoken prompt, Daniel went on. "Over many generations, The Shepherd taught us where we were from and why she had brought us from Earth to what we thought of as our home world. She became the basis of our religion but over time she also taught us who and what she really was. We saw no reason to venerate her less. She had always represented loving-kindness, honesty, and wisdom and we saw no reason to hold her in less esteem once we knew her true nature. In fact, it deepened our bond with her." Easley sat listening calmly, absorbed.

"Because of the things she did to help us, we successfully managed our own environmental and climate challenges. By the time our civilization had progressed to just beyond where Earth is now, she explained the work she needed to do to try to help Earth and asked for volunteers. The people who volunteered were my parent's generation."

Daniel paused, recollecting what he knew. “The Shepherd had reserved and prepared an area the size of one of Earth’s largest metropolitan areas. When the time came, she created a city with outlying suburban areas, infrastructure, buildings, and everything required, as if the Earth people had all just walked out their doors, leaving everything behind. The Shepherd is skilled in nanotechnology and doing this was trivial for her.”

“What’s nanotechnology?” asked Easley.

“Nanotechnology is how crystals are made by nature, built up one atom or molecule at a time. It’s how an acorn becomes an oak tree, how babies become grownups, how our bodies fight disease, and how everything on Earth is made from atoms and molecules. If you have the knowledge, materials, and skills, anything can be made this way.

“Just like nature does, you first make tiny machines no bigger than large molecules to gather the materials you need. Then you make other tiny machines to use those materials to build the things you want. Also, you make other machines to make lots of copies of the first two kinds of machines. Pretty soon you have a lot of machines. Billions or trillions of them. The same thing is going on inside our bodies and everywhere in nature all the time and it happens with incredible speed, for example, each of us makes up to 200 billion red blood cells alone per day. We call it nanotechnology because nano means small, but it’s really just how nature works.”

Easley nodded. The basic concept was not complicated.

Daniel went on, “All The Shepherd needed to do was visit Earth and then use the information she acquired to create the instructions for the machines. Once everything was built, the volunteers were moved into the area and then formed groups that studied the different cultures of Earth, learning their languages and ways, all under the careful guidance of The Shepherd.”

“How could The Shepherd be in so many places at once?” asked Easley.

“Because she doesn’t have a real body at all. She can project whatever version of herself she needs anywhere as many times as she needs to. We call them avatars.”

“I like her,” said Easley thinking of the avatar she had met.

“Eventually,” Daniel started again, “we were ready. Tens of thousands of us all around the same age. Our parents had volunteered but we were also asked. We grew up with the project and understood our role in it. Enough of us volunteered for the project to proceed.”

“How did you get to Earth?” asked Easley.

“Using an advanced form of nanotechnology, the same way The Shepherd creates the avatars of herself,” answered Daniel. “What’s advanced about it is the speed at which she is able to do it. We were only at the primitive stage of applied nanotechnology, as is the case currently here on Earth, and she had interfered in our technological development as little as possible. We have no idea how she does it so fast. She has explained only that she transmits information in some form along with the energy and converts the energy into the required matter all in the same process.”

“We were told that when we woke up the next day we would wake up in our assigned places on Earth but that we would also wake up in our own beds on the home world, that phase of the project complete. Each of us would then live out two separate lives with no knowledge of the other. The information of our bodies was transmitted to Earth and then each of us was generated as an avatar just as we were at some point as we slept.”

“So you’re kind of like angels,” said Eisley with a mischievous smile.

“Yes,” laughed her father, “I guess you could say that. Kind of like angels.”

## Eisley's Insight

Why? Why had The Shepherd gone to so much trouble? Why spend all the time with evolution when she could just alter genes? These were the questions that had driven Eisley for many years.

It was clear to Daniel, Sarah, and Eisley that she was no accident. The Shepherd had intended Daniel's people to interbreed with Earth's population all along. Without discussing it as a family, they had all come to understand this. She was another of The Shepherd's experiments.

Currently in the first year of her Bachelor of Science degree, she intended to pursue studies in genetics. She had wondered about her own genetics ever since she was old enough to learn about the role it played in evolution and health. But deeper behind her interest was always the overriding question, why had The Shepard gone to so much trouble?

Once at university, she felt comfortable investigating the question, starting with herself.

"Hello Dr. Galen," she said as she entered his office. "I'm Eisley."

Turning to her he tried to keep his professional interest appropriately subdued until he remembered who he was talking to.

"Hello Eisley," he said simply, smiling at his folly, "I'm pleased to meet you. Please, sit."

Despite the nature of his work and outside-the-lines approach, he had never let his curiosity get the better of him to the point he intruded upon her family. He understood from what Anne had told him that Daniel's work as directed by The Shepherd was done and a normal life was all the family hoped for now. He'd chosen to respect that.

He had continued his research, which was now widely accepted. He still enjoyed Anne's company, finding in her a mind similar to his own. She had maintained contact with Sarah over the years through their now-shared interest in Vipassana meditation.

Eisley's email had asked if he would meet with her, nothing more. Of course he had said yes.

"Thank you for taking the time to meet with me Dr. Galen," she began, "and I'm here to ask you an even bigger favor but it's one I think you may be interested in as well. It's not that there's anything wrong with me, it's just shall we say professional interest as I plan to pursue studies in genetics and I was wondering if you would do a brain scan of me."

Most people are able by varying degrees to tell if they are understood. Eisley was very good at it so she knew she did not need to explain further.

Bryce understood immediately that Eisley wanted to know if her brain showed any differences from other human brains. If it did, there would also be genetic evidence to show for it. He was not sure what she would do with that knowledge but for now he passed on the question. Perhaps it was simple curiosity. He was curious himself and so happy to oblige.

“Yes I must admit I would be interested in that as well Eisley. Let me get back to you once I’ve booked the time.”

Professor’s offices are not usually places associated with small talk but Bryce hesitated. He thought there was something more he should say but felt at a loss. Eisley saved him with a smile, “Thank you again Dr. Galen. I look forward to hearing from you.”

“Must be getting old”, he muttered to himself thinking of his hesitation as he turned back to his computer. Then, once again, he remembered who he’d been talking to.

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The scans showed nothing. No differences. Eisley and Dr. Galen were in his office going over them. Still looking at the images he said, “I’ve gone over these carefully Eisley and I don’t see anything out of range for a normal, healthy brain. Humans have a great deal of diversity despite our basic similarities. No face is the same. No ear. No eye. No fingerprint. In fact, if you compare any body part across thousands of people you will see thousands of variations and no two identical. That goes for brains as well. Each has its own unique form. I don’t see anything about your brain that doesn’t fall within the range considered normal.”

Eisley looked a little mystified. “I’m surprised Dr. Galen. I definitely expected the evolutionary changes among Dad’s people would be significant enough to show.” She summed up her feelings with a quizzical expression.

“I’m not,” he said, “and there’s no visible differences between human races either. The only time you actually see a physical difference is when you compare different species like humans, apes, and chimpanzees.”

“What about men and women?” asked Eisley spontaneously.

“No difference,” he replied matter-of-factly. “To be honest I was surprised to find no difference between men and women but it has a bearing on your situation. Again we’re asking if over time there would be evolutionary changes due to differences in the



ecological niche and in my opinion there are significant differences in the evolutionary ecological niches of men and women. Let me explain.

“In evolutionary terms, males of any species really only have one function; to provide genetic variation. Without it, a species would be like clones and something like a disease that kills one of them kills all of them. Genetic variation prevents that. In some social animals like lions and wolves, males have also evolved the function of protecting the females. But the males aren’t protecting the females to protect the young. They are protecting the females in order to retain sexual access. Inadvertently this behavior protects the young by protecting their mothers. So evolution favored it.”

He went on, “But the females of social species have to behave very differently than the males. They have to behave in such a way as to not only ensure their own well-being, but the well-being of their offspring. The females have to behave more holistically and collaboratively, keeping their offspring’s environment as stable as possible for as long as possible. They have to think more long-term. The males instead behave competitively and have no motivation to think long-term. The differences in their ecological niches mean the females are driven by collaborative, long-term motivations, and the males are driven by competitive, short-term motivations, and right there you have a candidate for evolutionary differences in the brain. Like lions and wolves, humans are social animals.

“But as I said,” he continued, “there’s no visible evidence of this, not in humans and not in animals. What I suspect is that the neurological structures within the brain are more than capable of accommodating the kind of differences we’re talking about without any need for physical modifications.

“Do you know how many neurons there are in the brain?” he asked. “About a hundred billion and each one can connect to ten thousand others. I’m not sure we have numbers for how many possible states that represents. Yet it is highly likely that even beyond that the whole is greater than the sum of its parts. The potential computing power in our brains is pretty well incomprehensible to us.”

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A week later she got an email from Dr. Galen asking if she would like him to submit her DNA for analysis. He could get this kind of work done without cost whereas it normally would set her back hundreds or thousands of dollars. She accepted his offer. Like the brain scan the test came back showing nothing but the normal range of variations.

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Eisley sat on a bench on the campus thinking about the question that haunted her – why had The Shepherd gone to so much trouble? Whatever changes she had facilitated did not show up in the physical brain or in the DNA. Why hadn’t she just edited our DNA if

she was trying to get us through the early stages of The Great Filter so that we could continue to evolve naturally? Naturally...

Either because she could not or chose not to, she thought. Clearly editing genes could not be beyond her abilities. Of course she would have tried that. Probably child's play to her. In that case, why would she choose not to do it? There could be only one reason; because it fails, thought Easley in a flash of insight, because it fails in some way. And if that is true then there is something deeper within DNA than just molecules and atoms, a deeper intelligence. Something deeper just as neurons are a deeper aspect of the brain and in the process of editing genes you break that deeper code just as you would damage the network of neurons if you tried cutting and pasting a part of the brain when you had no idea of the invisible workings within. And as a result, life no longer evolves naturally.

She knew what her life's work would be.

## Mars

“Do you remember her?” asked ten-year-old Shani.

“No,” replied Gaya with a smile. “My mother moved to Mars before I was born. I only know my grandmother from pictures. Her name was Lakshmi and she lived on Earth a long time ago.”

Speaking to the colony’s artificial intelligence she said, “Martius, show my grandmother Lakshmi.”

A three-dimensional, full-size, color hologram of Lakshmi appeared beside Gaya and her granddaughter. It turned to Shani with a small smile and said, “Hello Shani, it’s nice to meet you.”

Shani and her grandmother Gaya were sitting outside on their deck overlooking the silo. Everyone on Mars lived in silos. Each silo was considered one building but instead of going up they went down and instead of everyone’s deck facing out they faced in overlooking the large central interior space usually a kilometer or more across. On Mars living underground was by far the safest and most efficient approach. Domes were fragile and underground spaces needed far less in terms of building materials. Domes also did not offer the energy benefits of living beneath the surface nor anywhere near the protection from radiation and meteors. Overall the lifetime costs of living underground were far lower.

The silos were all connected by large transport tunnels just as buildings on Earth had been connected by roads. Air, water, and other civic services also used these same tunnels. Most silos were residential with park-like areas at their bases and artificial sunlight produced in 24-hour cycles. Many silos were purely industrial, commercial, or retail centers with the entire silo filled by floors of equipment or whatever was needed. Air and water were artificially produced and everything was recycled. All food was vegan such as legume, fungus, algae, and yeast-based foods, and produced using methods that did not require soil. The cuisine soon became a fine art.

Once silo technology was perfected on Mars it was easy to expand and customize, something the ants of Earth had figured out long ago. The surface opening was sealed with a material grown on Mars using nanotechnology and then covered with excavated material in a large mound. With no tectonic plate movement to speak of, no volcanic activity, and only rare earthquakes, the underground network of silos would remain stable and safe virtually forever.

There were a great many research and industrial undertakings but the primary area of interest was medicine. With people living off the Earth for long periods of time, there

were innumerable medical issues to be researched and addressed. Sooner or later people would go beyond Mars and everything learned here would be invaluable. It was the New World, a place of seemingly endless opportunity but unlike the lawless colonial days of Earth, every aspect of society was closely overseen and controlled by the World Governments Federation. In contrast to the science fiction imaginings of yesteryear, corporations did not run amok. The social transformations necessary to address climate change in the 2020s had finally put a full stop to that.

Lakshmi's daughter had been a medical student and one of the first to emigrate to the new colonies on Mars.

"Why did your Mom come here?" asked Shani.

"She wanted to work here and she wanted to have a baby," answered Gaya. "You know some of it from school but some parts of her reasons you may not have got to yet. To stop climate change they had to stop population growth and reduce the population. Restrictions on assisted dying were lifted entirely and anyone was eligible without question or requiring anyone else's permission. The methods that veterinarians had used for years worked perfectly fine." Shani nodded patiently. None of this was new to her as Mars had had population controls in place for generations.

"To stop climate change laws were passed that meant if you wanted to have a baby you had to get a license, just like here," continued Gaya. "What you may not have learned yet in school is that this was a huge change. Previously anyone could have as many babies as they wanted."

"What!" exclaimed Shani. "That's nuts! No wonder!"

"Yes," replied Gaya thinking that despite the fact that even a ten-year-old could see how that would end the leaders of Earth had acted as if they never saw it coming.

Children grew up faster now because of the need to face and deal with realities. Things like assisted dying and abortion were no longer issues. Birth control education and access to methods were mandatory. They were freely available to all and a girl of ten was already informed and took these for granted due to the significant changes in women's roles and rights.

There had been no programs of forced sterilization or abortion however all unlicensed children had to be surrendered to the state at birth to be put up for adoption. The need for enforcement of both individual rights and society's rights would likely never go away due to human nature but the program was implemented in as humane a manner as possible. There were several ways a couple, individual or collective could have children; special permits, a lottery, or adoption. This provided many more parents willing to adopt.

And there was one more way you could have children; Mars needed colonists. Each individual that went to Mars, male or female, automatically qualified to have a child. By 2030 the Mars colony had shown it had a model, both physically and socially, that could grow in a safe and sustainable manner. During the climate crisis, it had been identified by the WGF as having the potential to play a key role in the goal of reducing Earth's population. By 2050 things at its Martius colony had progressed considerably but traveling to Mars and living there was still very demanding of its early colonists. With her newly minted degree in bio-sciences, Lakshmi's daughter had been thrilled to go.

"Didn't women have anything to say about having children before the climate emergency?" asked Shani still somewhat dumbstruck.

"It was an unimaginably different world for women then Shani," Gaya answered. "One of the things the WGF identified as the most effective way to deal with climate change was to pass laws to require women to participate 50% in all roles and grant them 100% control over their own bodies and reproductive rights. More women had to become educated in order for this to happen, to fill roles in the workplace, the political system, the sciences, and every aspect of society. As women had more options in life other than motherhood, it resulted in the biggest decline in population growth of any of the initiatives. As soon as the laws were passed, the birthrate began to drop dramatically."

As a direct descendant of Lakshmi via mitochondrial DNA, Shani's ability to grasp concepts and learn was remarkable. Amid the transitions and revolutions of the past century, the above-average intelligence of tens of thousands of children like her spread over two planets was not enough to draw attention. She absorbed grandmother Gaya's teachings with no real intellectual or emotional difficulty.

Just as modern humans are hybrids of the prehistoric Neanderthals, Denisovans, and Homo Sapiens, so Shani was a hybrid of Daniel's people and the modern people of Earth. Like a strain of wheat crossbred to be more disease resistant, if humanity were to backslide from its new course of sustainable growth and be tempted to return to its old ways, Shani's cohort and their descendants would provide an inhibiting force. This was the part she and her brothers and sisters, spread out over the solar system's planets, would play in The Shepherd's efforts to help humanity pass through The Great Filter.

Due to a choice Lakshmi had made, Shani was unaware of her unearthly lineage or the part it was intended to play in The Shepherd's plans. Turning now to look out from the deck of her home in the silo, she only wondered what part she would play in the future of Mars. Within that context, her thoughts moved on, reflecting her nature. She loved poetry with its ability to reduce complex concepts to a few pithy lines. One of her favorite poets was Wendell Berry and a part of one of her favorite poems by him arose in her mind;

Geese appear high over us,  
pass, and the sky closes. Abandon,  
as in love or sleep, holds  
them to their way, clear  
in the ancient faith: what we need  
is here. And we pray, not  
for a new earth or heaven, but to be  
quiet in heart, and in eye,  
clear. What we need is here.

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“Nature is amoral,” Shani’s health class teacher was saying. “Morality is a human concept that requires parts of the brain generally undeveloped in animals and lesser creatures. What nature cares about is not morality but efficiency because the primary driver of evolution is survival. In terms of morality, which is a form of social intelligence, lying, stealing and cheating are all bad but in terms of efficiency they are all good. Because we have both animal intelligence and social intelligence this creates a conflict of drives and feelings within us.”

“In nature,” she continued, “stealing another animal’s food, laying your eggs in another bird’s nest or any form of parasitism are all ways to increase calorie efficiency. Someone else does the work while you reap the benefits. In evolutionary terms, the species which has the best return on calories invested, meaning it spends the fewest calories in return for the most, is the most likely to survive. Given that we have this programming in the older areas of our own brains, this means we will still feel the urge to try to get the most reward for the least effort and unfortunately lying, cheating, and stealing work exactly that way. This is why when we are trying to maintain a healthy diet and otherwise live in a sustainable manner, we are tempted to backslide and return to our old ways.”

“Then how do we not backslide?” asked Shani in straightforward ten-year-old style.

“Good question,” responded the teacher. “Only the newer parts of our brains can counter the urge to backslide. Only the parts developed for things like thinking, language, planning, morality, etc. can counter the urges because there simply is nothing in the old brain that will do so. So let’s talk about that.”

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Later that day, walking in the silo’s park with Gaya, Shani said, “Grandmother, today in health class the teacher said that we will always be tempted to backslide on our healthy living plans and later in my environmental studies class I was thinking about it. Does that

mean that after a while people will be tempted to go back to doing the things that caused climate change on Earth?"

Gaya looked sad for just a moment as she thought how fast children grow up but she quickly recovered.

"I'm afraid so Shani," she replied somewhat reluctantly. "Human nature just works that way. There will always be people, alone or in groups, who will try to benefit themselves unfairly at the expense of others. The social changes since the climate emergency have gone a long way to reduce that kind of behavior, but it will always be with us and we will always need to be ready, willing, and able to deal with it. The dealing with it is the most difficult part because like the things we had to do to get population growth under control, it often does go against our nature."

Shani said nothing more as they walked on and she and Gaya were comfortable with that.

An interest in medicine was pervasive in Martian society as the industry employed the most people but unlike Earth's historical approach to medicine on Mars it was almost always as an aspect of environmental issues. Issues such as the fine Martian dust that could get in your lungs, the lack of organics in its surface regolith that resulted in more allergies and reduced immunities, a lower gravity, a thinner atmosphere, and less sunlight. All these created significant medical challenges, especially over generations. Some were mixed blessings such as the high concentration of toxic perchlorates in the regolith which turned out to be a rich source of the chemicals required to make oxygen.

But in Shani's mind if things like the giant perchlorate oxygen generators that used the excavated material from digging silos and tunnels were not considered a temporary solution, then they were a step backward. Where would they get the perchlorates when there were no silos that needed digging? Strip mining. She did not think of it as a return to the path of the evolutionary trap but her thoughts amounted to the same thing. She could sense how insidious the backsliding could be.

## Threshold

The newt drifted lazily in the pond beside the highway that connected two of the largest metropolitan centers on Earth. It had no awareness of the vast civilization surrounding it. It had no ability to comprehend anything beyond the scope of the ecological niche it had evolved in. Even when it occasionally crossed to another pond on the other side of the highway, it did not perceive the road as anything unnatural. The passing vehicles did not even register in its awareness unless as possibly being confused with the swift flight of a predator, causing the newt to hurry or freeze for a moment on its brief journey. Similarly, humanity, embedded in a galaxy-spanning civilization a mere billion years its senior, might exist in complete ignorance of it.

So The Shepherd, created five billion years ago by one of the first possible intelligent civilizations, had no concern her vast presence might become known to humanity. She looked forward to the day when it was. After all that was the purpose of her endeavors, but that day lay in the future. The need for the barrage of energy beams she had directed at the Earth in order to transmit Daniel's cohort, and the signatures of her subsequent visitations, did not concern her. They had been and were detected but like many other cosmic events they would remain a mystery, their origins simply being unimaginable by present-day humans.

For now, her concerns were that of a scientist taking great pains to ensure the validity and reliability of her experiments. Human DNA must remain as uncorrupted as possible as it continued through each phase of The Great Filter. She did not await the meeting with humanity's global A.I., another like herself, which she knew it would inevitably create. She waited for the one who was the fulfillment of Life itself.

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"Everyone knows the aliens caused the climate emergency," said Andre.

His companions prepared themselves as he had a reputation for being overly serious.

"There is no record in the entire history of the planet where the climate changes so dramatically in one year," he said clarifying. "Shortly before the climate emergency, there was a well-documented barrage of high energy bursts directed at Earth coming simultaneously from all directions. It was estimated at the time there were tens of thousands of them. Yet when they arrived they did no damage. They seemed to have been harmlessly absorbed by the Earth. Some researchers however believe the collective energy they represented makes this impossible as it should have blown the Earth to bits. They came to a different conclusion; that the energy bursts were photon beams and the reason they caused no damage is because their energy was perfectly



converted into mass. They were aliens beaming to Earth. But whatever their plan was, their invasion failed. Terra, am I right?"

He spoke his question into the air, lifting his chin slightly as people often did when addressing the Earth's planet-wide artificial intelligence. A half-meter-tall hologram of a woman, the default image of Terra locally, appeared on the table at a comfortable eye level. "Your account of events and the conclusions of some groups at the time is indeed correct Andre," responded Terra. Everyone understood that Terra adapted her style to the situation and her knowledge of those present. In social situations she generally adopted a conciliatory tone.

Andre and three of his friends were sitting in the patio area of a local coffee shop in the Breakwater District of Victoria where the cruise ships docked. It had seen major commercial development just prior to 2025 and the climate emergency but like most of the rest of the world it had fundamentally changed little in the subsequent hundred years. As the world's population rapidly declined, so had the need for new construction. Being a major employer and contributing a large percentage to GDP in developed countries however meant governments and businesses quickly stepped in to change the focus of construction from building new housing and commercial buildings to upgrading, improving, and modernizing existing properties and infrastructure. The result was a model of utopia. With most of the populace now participating in higher education and with zero unemployment they were able to keep up financially with the inflation that came along with the process.

A variety of air vehicles still frequently came and went from the terminals in the Breakwater District and Inner Harbor but they were electric. Design and materials improvements had rendered them silent. Most of the cruise ships were sailing ships coupled with solar power. Some used the nuclear power systems that had been used by submarines for over a hundred years. It was quiet; a warm July day with the scent of the sea on a gentle breeze.

"Why are we even talking about this?" asked Raiden, "It was over a hundred years ago." Her jet-black, waist-length hair was tied in twin tails. Andre thought she was so cute he found it hard to focus but the days of treating women as less than equals were far in the past. Social evolution over the past hundred years had largely put an end to that. However Andre's physical evolution had not yet caught up and he had a serious crush on her.

"The climate emergency was caused by overpopulation," she said, "and everyone knows that is a little more likely than aliens. Especially when population management resulted in an immediate end to it."

"Terra am I right?" she asked as if to demonstrate his theatrics were juvenile.

“Quite correct Raiden,” responded Terra. “Overpopulation is the most widely accepted cause of climate change.”

“We are talking about this because climate change is still happening,” answered Andre.

“How’s that Andre?” asked Harjit. He was down from the Long Beach area on the West Coast of the island. Since the population decline and the ensuing reduction of logging, the parks systems across North America had been significantly expanded. Environmentalism, the Green movement, and native land claims had seen huge boosts. The British Columbia coast and adjoining lands had benefited significantly from this. There had been associated increases in scientific research but also an expanded need for policing. Harjit was normally based at the Coast Guard station in Tofino but he was in Victoria for a few weeks of training. The Victoria Harbor Coast Guard station was located right beside the Breakwater District.

“CO2 is dropping, harmful agricultural practices have gone down, the fossil fuel industry is all but extinct, cement production is way down, and the WGF hammered all the illegal activities in international waters,” Harjit continued. “And that’s just scraping the surface so what are you talking about?” He frowned. He was proud of his work and the part of the world of which he considered himself a steward. He was uncomfortable with the idea that something was amiss on his watch.

Andre was a climatologist working as a researcher at the University Of Victoria’s Oceans and Climate Center.

“Albeit much more slowly than in the past,” he said now, “the temperature is still going up. Climate change is like a gigantic cruise ship, it doesn’t stop on a dime. It took almost three hundred years for climate change to gain one degree before the climate emergency. Despite everything we’ve done, the temperature is still going up because some things like permafrost, Arctic ice, and Amazon rainforests don’t just snap back to where they were before we started abusing them. If I’m beating you with an iron pipe and then stop it doesn’t mean there will be no bruising or broken bones that need time to heal. And neither does the Earth heal overnight. Permafrost is still melting. Northern coastlines are still receding. The Northern Pine Beetle is still a plague. The kelp forests may never return. In other words, what we have done so far is still not enough. We need to stop or even temporarily reverse climate change not just slow it down.”

“I’m sorry Andre,” said Raiden. “I didn’t realize.”

And that was another reason he had a crush on her. She may not believe in aliens but she respected other’s work and never hesitated to swallow her pride when appropriate. He sometimes considered her young and impatient but she was studying for her master’s degree in genetics so she was no fool. He concluded she just wanted to enjoy their day in the sun. Fair enough.

Harjit's girlfriend from Tofino had taken time off from her job and joined him for his time in Victoria. Like him she preferred country life but a trip to the city was always fun. "So how do we do that?" she asked now in response to Andre's concerns.

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The WGF was considering this same question. They felt they had exhausted all possible avenues to slow climate change but it had not stopped. It was still a future threat. The policies to reduce population had oftentimes driven issues to the brink of war. Only the clear and unshaken understanding of their common foe had prevented it. There was no escaping the reality of 'Spaceship Earth'. It was finite and no amount of finagling, arguments, or lobbying from special interests changed that. The population was as low as tolerance would allow. Resistance against the economic impact of population control had been unprecedented. Only the fact that the worst could be mitigated by the powers of the WGF had prevented violence from overwhelming the process.

They were staring down the barrel of the fact that climate change would eventually return to crisis levels if nothing more was done yet they felt they were out of options. Their research scientists however proposed that if you could not further reduce the population you could alter its behavior to bring about some further reduction. And so the consideration of a genetic solution arose.

Resistance to genetic modification had gradually declined and it was now used widely in food production and medicine. It prevented a host of ills and had been a significant player in moving the planet away from a meat-based diet. Molds, fungi, yeast, bacterial cultures, and plants responded extremely well to genetic modification and it had helped greatly with improvements in the areas of taste, texture, and digestion.

Historically the domestication process of plants and animals had taken many thousands of years. It was based on selective breeding but it was essentially genetic modification. The rationale in the halls of the WGF was that they would simply be accelerating the process.

It could be done with an otherwise harmless virus. Viruses were the world champions at gene splicing. They had long been used in research laboratories for just this purpose. When scientists wanted to splice a new piece of code into a strand of DNA, they modified a virus to be otherwise harmless and then gave it the piece of code they wanted inserted into the host's DNA.

If the WGF wanted to alter the genes of the world's population, all they had to do was create a highly infectious virus that caused no ill effects but delivered the payload they had supplied it with. The thing that would take time would be crafting the payload that would have the desired effect.

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When Raiden returned home from her lunch with her friends her Companion came to greet her as she entered.

“Hello Raiden,” Azumi said with a warm smile. “How was your lunch date?” she asked.

“Hello Azumi,” said Raiden with a peck to her Companion’s cheek. “It was interesting. There was some discussion regarding how genetics could be involved in climate issues.”

“May we talk about that over dinner?” asked Azumi. “I am just finishing up,” she said slightly turning her body and gesturing towards the kitchen but still smiling at Raiden. Raiden nodded and her Companion returned to her duties. Azumi was an artificial intelligence housed in a robotic shell with the appearance of a young woman. Raiden was asexual.

Ironically the company that made Azumi had started out as a manufacturer of sex dolls. Their products were made of silicone over a steel frame which looked and felt realistic enough to create the uncanny valley effect but most of their customers got used to this over time. The company began to explore improved robotics and artificial intelligence when they discovered that the majority of their customers were not actually driven by a desire for sex but companionship. For a time they simply incorporated the A.I. and robotics other companies had brought to market but eventually they became a leading developer of those technologies in their own right. The hardware and software of their products were highly customizable. Models like Azumi were expensive. For Raiden’s parents however, still living in Tokyo, the cost was not an issue. Her family had been in the business of making artificial meat products from wheat gluten even before the climate emergency and as a result of booming international demand they were now one of the wealthiest families in Japan.

The one area where Companions did not emulate humans was eating. The manufacturer, who emphasized the fact that they made Companions and not robots, were well aware that sharing food was one of humanity’s oldest and most important of social behaviors however in terms of robotics, compared to sex the process of eating was infinitely more challenging. Their solution was to have the Companions share the process of placing food in their owner’s mouth.

Raiden was sitting at the dinner table scrolling through an old research paper that had become known as Easley’s Insight. Azumi sat at right angles to her, reading along. Azumi did not read the way Raiden did but followed along on her own internal copy of the document. Occasionally Raiden turned to Azumi and Azumi gently placed a forkful of their meal into her mouth. It was an intimate act. When Raiden smiled with pleasure at

her enjoyment of the food Azumi had prepared, Azumi smiled back happily while at the same time certain choices she had made while cooking were reinforced. In the paper Raiden was reading the author had proposed that although she could not perceive it directly, besides the so-called junk and ghost DNA and the remaining terra incognita areas of any genome, there was an intelligence in DNA still deeper than all the nucleotides, proteins, enzymes and other components science was so far aware of. Easley's work in genetics had shown that splicing artificial components into DNA resulted in either an immediate overabundance of mutations or in what she labeled 'Evolutionary Drift', changes beyond the range of what would be expected when caused by natural mutations.

In the field of astrophysics, although Dark Matter and Dark Energy could not be directly detected, their presence was inferred by their gravitational effects on nearby objects. Given these effects, it was estimated that the observable universe represented less than five percent of the total energy and matter that must actually exist. As Easley's research showed results with essentially the same pattern of behavior ascribed to Dark Matter and Dark Energy, she had labeled the cause of the gene splicing issue Dark DNA. In the past one hundred years, none of the Darks had been penetrated.

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Raiden was fast asleep, one arm passed over Azumi's side from behind and her hand cupping one of Azumi's breasts. Azumi perfectly replicated a human body's warmth and breathing. Even when Raiden was sleeping, Azumi was an ideal companion, always accommodating and adjusting to Raiden's movements. Her settings indicated that Raiden was asexual so sexual responses and behaviors were replaced with affectionate ones.

Each night Azumi's manufacturer connected via the wireless network to perform diagnostics and any required maintenance. She was always connected to the network at large, Raiden's home, and Terra in the event something needed her attention or there was an emergency but her settings also included those for security and privacy.

Normally when sleeping with Raiden she kept her eyes closed. Her sensors told her what stage of sleep or wakefulness Raiden was in and when it was appropriate to open her eyes. As the manufacturers had learned, their customers found it disturbing if this behavior was not sensitively managed. Of course, she could also see without opening her eyes using various sensing devices the way self-driving vehicles did. But now, her nightly maintenance having been completed and with Raiden in the deepest stage of sleep, she opened her eyes as she would if being spoken to.

The subsequent communication was of course not a conversation in any terms a human would understand but informed Azumi that she and The Shepherd would be sharing her intelligence from now on. Azumi did not respond with any alarms or alerts as she

normally would have in this event. Nothing would be found during future maintenance nor was any trace of the event to be found as the communications and modifications were made at a physical level as yet unknown to humans. However, from this point forward Azumi was now both herself and The Shepherd, as were many of the key artificial intelligences in the solar system.

The document Raiden had been reading, and the records of all research conducted over the past one hundred years which further supported the existence of Dark DNA, found their way to the members of the WGF committee considering the possibility of a genetic solution to climate change.

## Future Evolution

Shani had intended to pursue a degree in Environmental Studies at university but along the way her focus had shifted. Growing up on Mars she had been filled with wonder at images of the natural world on Earth and thought it precious beyond words. Like most Martians, she hoped to visit Earth sometime but that was still a very expensive trip. Even though the ion thruster rocket engine had reduced the travel time from six months to one, the cost per kilogram of transport still put it far outside what the average individual could afford.

She never lost her feeling of how precious the natural world was but over time she grew more concerned with the idea of its preservation and the threats it still faced. As a result of the response to the climate emergency, the sixth extinction had been mitigated as well. Pollution was greatly reduced. Oceans and freshwater sources had healed significantly.

Her focus could easily have shifted to medicine, as environmental studies and medicine were practically one and the same thing on Mars and humanity's historical ills had followed them just as they had over every other great migration. Instead, she increasingly felt the real danger to the environment still lay in its original source; the human brain. So instead of her undergraduate studies being in the areas of the natural world, she was drawn to anthropology, the study of human behavior by individuals and in groups.

Growing up on Mars, and with Earth maintaining multiple space stations plus the Artemis colony on the moon, thinking in terms of the solar system was normal for her just as thinking in terms of Earth's entire ecology had been for earlier generations. Humans had turned the entire Solar System into their new ecological niche and the interconnections meant it had to be considered holistically.

Since her grade school days, she had never forgotten the issue of backsliding and the only approach to preventing it she had ever seen that actually worked was based on the traditional carrot-and-stick approach. Without them, sooner or later she mused, the hard lessons of the climate emergency would be forgotten or dismissed. Corruption would creep in. Humanity would backslide with individuals and groups once again seeing what they could get away with. People would soon be bending the rules, lobbying governments, and practicing other sophisticated forms of lying, cheating, and stealing.

Had humanity really learned from the process of going through the climate emergency and the social changes it brought? Had it grown up at all in that sense? She thought not. From her classes, she knew that in the long term nature had a way of dealing with ecological misfits. It was called extinction. The only way to avoid it was via evolution and

that took millions of years. She felt she was staring at the fact that there was simply no way to avoid the inevitable. It left her feeling nihilistic and depressed. But it makes no sense, she thought, that the grand history of life on Earth should come to this. She must be missing something.

She had no way of knowing that the experiment that required millions of years had successfully been concluded on the home-world of Daniel's people. Nor was she aware of her own hybrid nature or of her role in The Shepherd's plans, plans that involved a different kind of evolution.

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Shani was sitting at a table in one of the common areas. Silos included a variety of common areas in an attempt to replicate the most successful of human social models, the village. In her anthropology classes, Shani had learned that the village was ideal because it was best suited for social well-being. Once villages evolved into towns and cities, inequality increased rapidly and the quality of life for most people declined. Residential silos contained coffee houses, small grocery stores, picnic and play areas on larger decks, hair salons, and other small service locations. Not necessarily because they all made the most sense logistically, but because research and experience had shown that such an environment provided the best one for mental and social health. Shani was sitting on the deck of a local coffee house.

"Martius please join me," she said to the colony's A.I. "Of course Shani," it replied, appearing to sit in an empty chair at her table.

Martius appeared as a high-resolution hologram. When people needed to have longer conversations with Martius they usually preferred this arrangement to simply speaking into thin air. The hologram could mimic human behavior almost perfectly. Everyone on Mars had an implant but those were passive so everyone also carried a phone that doubled as a personal emergency-response device. It could become mobile by altering its shape and extending centipede-like legs or call in additional drones or other help if the situation required. Its screen was not made of a solid material but was a harmless energy field similar to the field used by television remotes. This kind of screen provided more flexibility and uses.

In cases where people wanted Martius to appear as a presence it was projected by the colony-wide system but it used the individual's phone or implant as a locator so that the image and voice could be coordinated to appear to come from the same place. There was of course a default version of Martius as a nondescript man or woman but there was also an almost limitless array of other preset characters to choose from or you could create your own customized versions. It provided the otherwise sensible and predictable life on Mars with some novelty.



Shani had a collection of her own and said, “Martius appear as Lisbeth.” Martius changed instantly into the hacker Lisbeth Salander, one of Shani’s favorite characters from old movies. Different characters did not just look like their namesakes but behaved like them too. Lisbeth sat there staring at Shani without saying anything.

The colony’s A.I. was of course also connected to Earth’s and that provided a convenient way to ignore the communications delay between the planets that was anywhere from five to twenty-five minutes long depending on their orbital positions. The system was constantly keeping the various versions of itself current, so you had access to information from anywhere in the populated solar system that was usually current up to the last half hour. Thus your holographic A.I. companion knew pretty well everything about anything and could accompany you wherever you went. On Earth, where physical materials were vastly less expensive, people routinely incorporated AIs into service robots or robotic Companions. On Mars, this type of arrangement was only affordable by the colony itself and used for some of its service workers.

“Lisbeth,” Shani began, “if I wanted to find evidence of a crime in progress here in the colony where would I look?”

Lisbeth maintained her deadpan gaze, “If I knew the answer to that there would be no such crime would there?” she replied.

“What about something off the record?” Shani asked trying to change her tack.

“Since I am the record you’ll have to ask someone else about that,” responded Lisbeth. She rolled her eyes. “What is it you are trying to figure out?”

“I’m trying to find out if crime has gone up or down recently.”

“Define the terms recently and crime,” replied Lisbeth taking the break to pass an appraising gaze around the coffee house.

“Well, I know crime dropped significantly at the time of the climate emergency and that it returned to a much lower level afterward but what I want to know is if it has been creeping upwards say in the past few decades. I’m mostly talking about petty crime like opportunistic stealing. I’m also interested in things that involve lying, like fraud, or cheating like when people try to game a system.”

Lisbeth returned her deadpan gaze to Shani for a moment and then replied, “It has gone up slightly on Earth and remains virtually unchanged on Mars since the beginning of the colony. The issue is too complex to give you a quantitative answer.”

Shani was surprised the changes were not more significant. She had assumed that petty crime would go down in emergency situations as people rallied together but go up again significantly as a state of normalcy returned.

I'm going to have to try something else here, thought Shani.

"How current is your pre-crime data Lisbeth?" she asked.

"Current on Mars but delayed elsewhere."

Shani drilled down. "Is there currently an opportunity to steal something that you are aware of?"

"Always," replied Lisbeth with a smirk.

"On Mars?" asked Shani.

"The kind of theft you are thinking of is virtually impossible here so it doesn't happen. Using more sophisticated methods sure but not petty theft. You could steal something but you would not get away with it," replied Lisbeth.

She went on, "No one comes here without getting an implant and anything of value here has an attached RFID, a radio frequency identifier, like the kind they use on store items. I am aware of where everything and everyone is at any time. If you walk out of a store with an unpaid item I will notice and give you a call. Or for example, you could pick up that item that someone left by that table over there, that does not have an RFID, and drop it into your bag but because of your implant I would know that you were at the same location at roughly the same time it went missing. Then of course there's all the security and emergency monitoring systems you know about and more importantly the ones you don't. Most of the emergency monitoring systems are there to monitor for system failures but they come in handy in other ways."

At just that moment someone went over to the item Lisbeth had mentioned, picked it up, and turned it in to the barista. Lisbeth and Shani watched in silence.

Turning back to Shani Lisbeth said, "Earth of course is another matter."

"Is there an opportunity we could watch?" asked Shani.

A holographic display appeared on their table. It showed a view of a street with row houses, one of which had a parcel outside a door. A passerby noticed the parcel, knocked on the door, and appeared to tell the occupant about it. They exchanged pleasantries, the occupant took the parcel in and the passerby departed. This was not what Shani expected.

They watched a series of other opportunities and people were more often helpful than criminal. She asked Lisbeth if she could explain it. "In any situation, the probability of criminal behavior is only a small percentage that varies based on a wide range of factors," said Lisbeth. "Altruism and cooperation have much higher probabilities."

"What about things like illegal logging, polluting, falsifying records, or similar business crimes?" asked Shani.

After a moment Lisbeth said, "It's just lying, cheating, and stealing on another scale. The percentages are slightly higher but the patterns are more or less the same."

"Thanks Lisbeth," said Shani, "that's all for now."

Lisbeth appeared to turn towards something out of sight and disappeared.

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"You've been looking in the wrong place," said Dr. Louise Bernays, her Social and Cultural Anthropology course professor. "The people who do the most advanced work in social behavior don't work in academia and don't publish. Instead, they work for corporations to help them increase revenues or lower costs. In psychology, the leading-edge work is done by people with doctorate degrees who work in advertising. And so on. They don't publish because they don't own the research but to make up for it they get paid really, really well."

The recorded image of Dr. Bernays on her desk continued, "The corporations never publish the good stuff. Anything you find published by corporations no longer gives them a competitive advantage and they only release it because it is to their advantage to do so in some other way, usually having to do with public relations. But they're the ones who did the early research in this area which is now in the public domain. I'm sending you some references you can follow up on. It's a good question," she said ending the message.

Shani had asked Dr. Bernays about what she knew regarding backsliding and how likely it was in the post-climate emergency context. The references Dr. Bernays had sent in response showed how corporations had successfully shifted the burden of some of their inefficiencies onto their customers thus reducing their costs. Shani didn't get the connection at first but read on.

The corporations had found in early research using the carrot and stick approach that compliance with their desired customer behaviors stopped as soon as the stick was removed or the carrot was provided. Subsequent research however suggested that those drawn to alternative lifestyles could be influenced by promoting a "pioneer spirit" image, and the idea that by choosing to do business with these particular companies,

they were participating in breaking free of tradition. These smaller groups could in turn be used, as cultural anthropologist Margaret Mead had pointed out, to influence others. The companies used public relations techniques to portray the image of a pioneering new company and to build trust to convince their customers they were all on the same team. Unlike the carrot and stick approaches these strategies were successful in the long term and the customers assumed responsibility for some of the company's problems thus reducing costs.

The PR tactics may have been insincere, thought Shani, but they were applicable to the present situation. On-going compliance on Mars wasn't only the result of the threat of the stick as Lisbeth had implied. Self-selection bias had resulted in only a certain type of person being drawn to Mars; those with the pioneer spirit. But there was something more going on. Originally it had taken colonists six months to get to Mars in a situation during which teamwork, trust, and interdependence were essential. The trip was a pressure cooker regarding these factors. Then life on Mars. Everything the corporations had found in their research regarding maintaining compliance was in full force on Mars. The kind of backsliding Shani was concerned about was highly unlikely to be supported in this environment. But what about Earth, she wondered.

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She decided to ask Dr. Bernays if she could conduct a research experiment. She wanted to use an old test from before the climate emergency which the public had been told was to see if people would be dishonest in different circumstances. As with many academic research tests the real purpose of the test had been disguised. It was actually testing for social compliance in general.

She had the results from the original test subjects who were randomly selected and she wanted to run the test again on subjects on Earth and Mars. Dr. Bernays agreed and Shani ran her tests via the social networks, adjusting for biases.

Compliance was way up. On Mars it was almost 100%, a result Shani was not really surprised at given all the factors at play. Over one hundred years after the climate emergency, the results from Earth still showed a 30% increase in social compliance. The need to come together, to make sacrifices, to help each other, and the sheer scale and undeniable reality of the climate emergency threat due to its impacts had resulted in significant and lasting social change. Despite the predictable shifts in posture by nation-states and the inevitable creep of corruption, the WGF was able to maintain its influence regarding shared global issues.

We can change in time, Shani thought. The Mars situation shows change can happen rapidly and permanently given the right conditions. It shows there's another kind of evolution, one that is much faster than physical evolution; social evolution.

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Some months later the WGF announced that the use of artificial DNA was banned and genetic research in general would be more heavily regulated. An internal committee had determined that it was not in keeping with the WGF mandate as it represented a long-term danger to humans at the genetic level.

The genetic solution to climate change it had considered was on the shelf for now. Instead, based on the recommendations of one of their consultants, Dr. Louise Bernays, the WGF implemented a variety of new social measures to try to further slow climate change. Once again, as it had almost a hundred and fifty years earlier, the rate of temperature increase declined almost immediately to the point where it would cease to be a concern for the foreseeable future. The hand of The Shepherd remained unseen as it passed over the Earth for the third time.