



TOMORROW PROJECT ANTHOLOGY

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JOURNEYS THROUGH TIME AND SPACE

THE FUTURE
Powered by Fiction

Journeys through Time and Space

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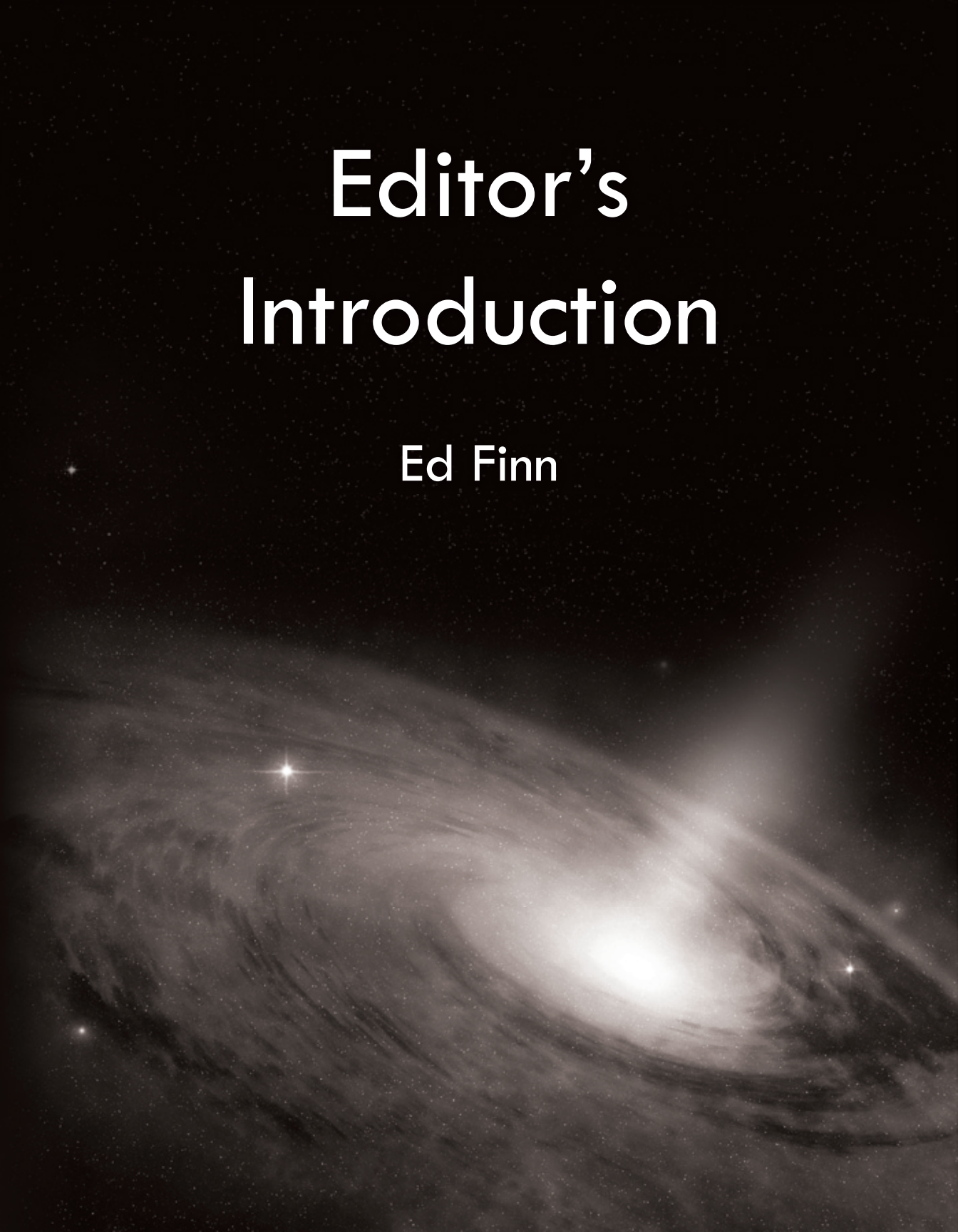
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Editor's Introduction

Ed Finn



Perhaps more than any other single metric, humanity has defined itself by its journeys. From the moment we first left Africa in waves of migration that spread the species from the Arctic to remote Polynesian islands, we have learned who we are through real and imaginary voyages. History is a record of these migrations and journeys, for good and for ill, from the colonization of the Americas and the Atlantic slave trade to Martin Luther King Jr.'s March on Washington. Journeys are voyages of discovery, of opportunity, of hope—they inherently assume that going forward is better than going back. As these examples suggest, journeys are not always about traversing space. We're all traveling through time, with stories whose fixed endpoints do not diminish the drama of the intervening episodes. We're all pursuing voyages of discovery within our own minds, learning who we are by traversing landscapes of the imagination.

In fact, every journey is a journey of the imagination. We travel in order to see the world in new ways, and thereby to understand ourselves in it a little better. From *The Odyssey* to *Star Wars*, we learn that journeys have no odometer or artificial finish line: they continue until we have learned what we need to know. Odysseus and Luke continue on their journeys until the *interior* territory has been discovered and they come to understand their purpose in life. To use a nonfictional epic example, the success of the Apollo Missions was not restricted to those few who walked on the Moon. The journey of discovery changed all of us, giving humanity a new sense of optimism and ambition. At the time it seemed almost inevitable that humans would walk on Mars and begin to explore the broader solar system in a few short years. But even today we are dreaming the same dreams that were inspired by those tiny capsules voyaging to the Moon.

Journeys are still deeply compelling to us, even though it seems as if every square yard of the planet has been mapped, claimed, and tagged on social media. The undiscovered

territory haunts us, and those who journey there capture our imagination. When we read about filmmaker James Cameron voyaging deep beneath the ocean's surface in a submarine he helped design, or Scottish author Rory Stewart walking solo across war-torn Afghanistan, the world gets a little bit bigger and more mysterious. Videogames offer us some of the most compelling frontiers left. Video blogger Kurt J. Mac has devoted over four hundred and seventy YouTube videos to his long march to the edge of the *Minecraft* universe, taking us to the “far lands” where software glitches make the terrain increasingly unstable. Making the terrain a little less stable is the ultimate mission of all journeys of exploration and discovery—news of distant places and unexpected vistas shakes up the status quo and helps us to see the world anew.

The best journeys are those that inspire others, and the Tomorrow Project has long been a kind of travelogue for the imagination—a dazzling series of excursions into the future that help us understand who and where we are. This collection, *Journeys through Time and Space*, takes that theme to heart with a set of stories that lead us on journeys that provide both thrilling and terrifying glimpses of what may be around the corner. As Walt Whitman once put it in *Leaves of Grass*:

Not I, nor anyone else can travel that road for you.

You must travel it by yourself.

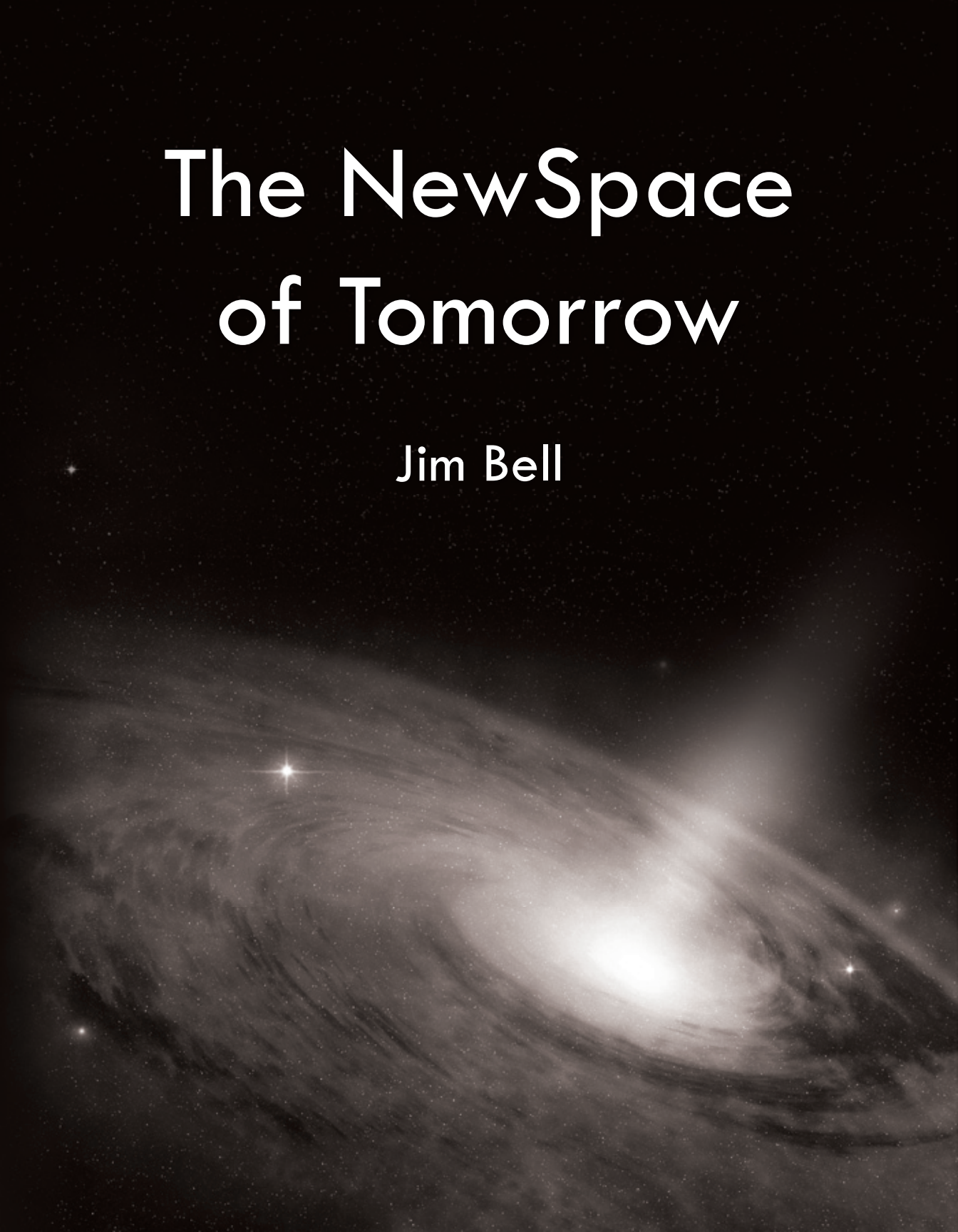
It is not far. It is within reach.

Perhaps you have been on it since you were born, and did not know.

Perhaps it is everywhere—on water and land.

The NewSpace of Tomorrow

Jim Bell



We are in a sort of doldrums of human activity in space. With the retirement of the Space Shuttle in 2011, the U.S. no longer has its own way to launch astronauts into space. Instead, we rely on Russia for launch services to the International Space Station (ISS). That situation will change in the next few years, as NASA contracts U.S. companies (specifically Boeing and SpaceX) to ferry its astronauts to and from the ISS. But even then, that means access to near-Earth space only: so-called “Low Earth Orbit,” or LEO. To get a sense of how close to home that is, imagine the Earth is a basketball. Now pinch a dime between your finger and thumb and hold it up against the basketball. The top of the dime—that’s it!—is where the Space Shuttle flew, is where the ISS is, is roughly where the Hubble Space Telescope is. That’s pretty close to home, and that’s why the frontier of exploration isn’t really defined anymore by missions that “only” go to LEO. On that scale, the Moon is all the way across the room.

That situation is slated to change, however, over the next few years. NASA is now using much of the funding formerly dedicated to the Space Shuttle to design, build, test, and operate a new rocket and spacecraft specifically designed to go well beyond LEO, into deep space, for future human missions to asteroids, the Moon, and eventually Mars. The rocket is the so-called “Space Launch System” (SLS), which is a hybrid of Apollo-like and Shuttle-like rocket technologies designed to propel large amounts of mass out of Earth’s orbit. The spacecraft is the Orion capsule, currently being designed to be capable of carrying up to four astronauts on a deep space journey of up to three weeks. At the same time, SpaceX is developing their “Falcon 9 Heavy” commercial rocket, which could also lift heavy payloads (including human missions) beyond Earth’s gravity, and working to optimize their “Dragon” resupply module to carry astronauts on deep space missions (the LEO version of the Dragon spacecraft is being designed to carry up to seven

astronauts to the ISS). All of these systems are being actively designed and prototyped now, and full flight testing of the heavy lift rockets is scheduled to occur over the next few years, in anticipation of potentially launching regular human missions to deep space in the early 2020s.

In the meantime, humans are currently exploring deep space in another way—indirectly. NASA and other space agencies are controlling more than thirty different robotic spacecraft that, together, make up an impressive armada that has been sent out to explore our solar system and beyond. The robotic exploration of the worlds around us has followed a logical arc of progress, a strategy referred to by NASA as “flyby, orbit, land, rove, and return.” That is, first we have simply flown quickly past a new world for initial scouting or reconnaissance. For the outer solar system, the *Voyager 1* and *Voyager 2* spacecraft represent the most important first steps in this process of discovery, delivering some of the earliest flybys of the giant planets (and the first and only of Uranus and Neptune). Indeed, we are getting close to completing the “flyby” phase of solar system exploration for almost all of the major classes of objects (planets, moons, asteroids, and comets) in our neighborhood. An important milestone in that quest will be the NASA *New Horizons* mission flyby of Pluto in July 2015. Planet or not, the images and other data from that encounter are almost certain to be surprising and wonderful.

For many worlds, we have followed up those initial flybys with more careful orbital missions to spend significant time studying these places in detail. Part of the role of orbital studies is to find places to land, and we have now landed probes on a number of planets, moons, asteroids, and even a comet. A moving lander or rover represents another step forward in detailed exploration, but has only been successful on the Moon and Mars so far. But the most challenging step in the progression, and the pinnacle of robotic exploration, is the “return”: the successful return of samples to Earth by a robotic mission. So far, humanity (with help of robots) has completed six of these remarkable returns—from the Moon (by three Soviet *Luna* missions in the 1970s), from one near-Earth asteroid (by the Japanese *Hayabusa* mission to the tiny near-Earth asteroid Itokawa), from the solar wind (by the NASA *Genesis* mission), and from one comet tail

(by the NASA *Stardust* mission). Studies for future robotic sample returns from other asteroids, comets, and Mars and its moons are also being conducted.

In the fifty-plus years since the dawn of the Space Age, deep space successes have been achieved solely by robotic exploration, while human explorers haven't traveled farther than the Moon (and even then, only twelve landed, and no one has returned to the Moon in more than forty years). How should the future of space exploration unfold? Will deep space continue to be the realm of only our robotic emissaries? Will NASA and other government space agencies always lead the way? Will upstart private space-related companies (like SpaceX, Virgin Galactic, Sierra Nevada, and dozens of others) dive into the robotic space exploration game, and if so, why? For mineral resources? For fame and glory? To help protect the Earth from rogue asteroids or comets? To settle other worlds? Or will those companies instead focus mostly on providing services like lower-cost rocket launches, adventure tourism experiences, space station refueling and resupply, or satellite repair?

Those questions are at the forefront of the emerging space industry sector often called "NewSpace." Investors large and small are trying to predict which of these businesses, and which of these questions, will drive the future of space-related activity and research. And, perhaps unbeknown to most people, governments are playing important roles in the increasing privatization of space-related activities. NASA, for example, in their Commercial Orbital Transportation Services and other Commercial Crew & Cargo programs, has doled out more than \$2.5 billion of taxpayer funding over the past five years or so to spur the development of many of these "private" initiatives. In many ways, the government is playing a similar role today in the creation of a privately-run, civil space program that it played in the early-mid 20th century in civil aviation. In the 1920s, for example, the U.S. government was the biggest and most reliable customer for the nascent airline industry, paying out sweet contracts for the delivery of airmail to then-upstart companies with names like TWA, Northwest, and United. Which private space companies being seeded by tax dollars today will emerge as household names and NewSpace industry giants of the 21st century?

While missions like *Voyager* were science- and exploration-driven, many NewSpace (and traditional “OldSpace”—think Lockheed Martin or Boeing) companies are bottom-line and profit-driven. Still, there is great potential for collaboration and cross-fertilization. By analogy, fruitful partnerships have emerged in recent decades between leading environmental and ecological preservation organizations and some parts of the worldwide tourism industry. Non-specialist individuals and families can now take vacations that also support scientific research projects related to the ecology, archaeology, or sociology of their destinations. A similar model could be highly effective for space-related tourism. What many space scientists want most for their research is *access* to the space environment—be it experiments in low gravity, or new measurements from orbital or landed/roving platforms—and an *interested, excited audience* (preferably decision-makers at funding agencies, but really, anyone genuinely interested is valued) with whom to share their results. If that access is provided by private NewSpace companies, and part of the price is that researchers have to be tour guides and teachers for the paying public sharing the ride, so be it. It’s a model that could work. Flyby (with tour guide), orbit, land, rove, and return...

Indeed, looking to the more distant future, I like to imagine an entirely new branch of nerdy but potentially-lucrative adventure tourism that could be built around what I call “manufactured astronomical events.” We’ve all *seen* photos of the magnificent splendor of a total solar eclipse, for instance, but very few people have actually seen a total solar eclipse because they only occur about once every three hundred years in any particular city or region on Earth. But that’s because of the particular geometry of the Sun, Earth, and Moon for *Earthbound* observers. If we were to take a spaceship to the right places in space, it would be easy to fly the ship through the shadows of the Earth or the Moon and re-create the same kind of eclipse experience for those aboard the ship. As another example, there was a lot of hubbub a few years back about people viewing the last transit of Venus across the disk of the Sun until the year 2117. Not necessarily so! Take a ship full of astronomical adventure tourists to the right place in space and at the right time to watch, and voilà—there’s a Venus transit as good as any that you’d see from Earth. Many other kinds of manufactured celestial events will be possible to create once access to

near-Earth (and lunar) space becomes more routine. We could experience Earth + Moon solar eclipses, transits of Mercury or other planets, flights through active comet tails, flybys and landings on near-Earth asteroids, perhaps even visits to *Voyager* and other ancient spacecraft. Such excursions may never become as mundane as airline travel is today, but I believe that the trend will surely be towards safer, more affordable, and more personally meaningful access to space for regular citizens.

How can the optimists among us help to make that exciting imagined future actually come to pass? Ironically, one way seems to be to support our current government-led space agencies, because many of *them* are at the forefront of investing in commercial solutions for launch services, resupply of the ISS, satellite repair services, and even some aspects of space-related tourism. Indeed, government investment is already trickling down to tangible advances in commercial and private rocketry, communications, remote sensing, and Earth-based space-related products and services. Another way to help make this future a reality, though, will be through storytelling. A few of the five hundred or so people who have been into space so far have been—deep down inside—artists, or poets, or musicians, or people with otherwise intangible vision and ability to share the experience in some tangible way (through stories, or pictures, or poems, or songs), even though none of them were really selected for those traits. All that is about to change, however, as *real* artists, writers, musicians, and visionaries begin to travel beyond our atmosphere. Space is about to get a whole lot more interesting.

Right now, though, those storytelling astronauts of the future, and their countless to-be-inspired progeny, are mostly still Earthbound. Many are among the science fiction authors, space rock songwriters, seemingly weightless dancers, and visionary space artists that live and work among the rest of us. We read their stories, many of which are inspired by real-life science and space exploration discoveries, and find ourselves inspired to travel to these new worlds. We view their paintings and films and imagine ourselves there, among the rings of Saturn, atop the ten mile high ice cliffs of Miranda, skimming through the dusty storms of Mars....

Through the lens of art we can do more than just imagine—we can project both the best and worst of ourselves out there, living and working and loving and dying far beyond our ancestral home. Today’s imaginative stories and research-based visions of the future are the launch pad upon which, eventually, such actual adventures will occur. We need these vehicles to seed the discussion, and sometimes the debate, about what kind of space future we want. Literature and art and music will be just as important as science and engineering and technology in helping us make choices about our future in space, for individuals, for our nations, and for our species.

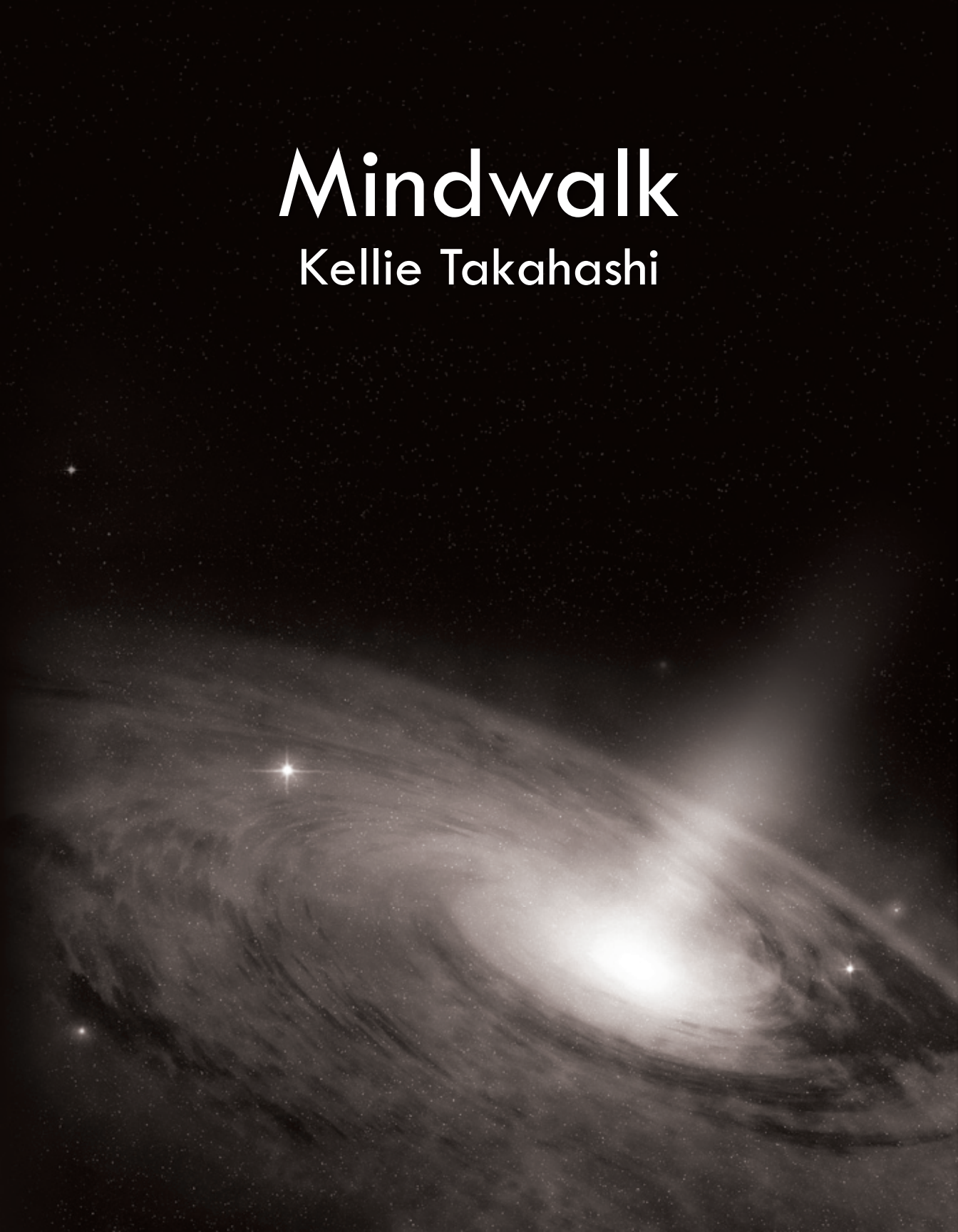
At times we strain to see beyond the turmoil and the swift pace of modern life. We forget to take a moment to look outward and perceive our place in time. We are all living—right now—in an amazing golden age of exploration, of our planet and of our solar system. In fact, via our distant robotic emissaries like the *Voyagers* that have left the realm of the Sun’s influence, we have now entered the Interstellar Age. Soon (in a relative sense for our young species), we are bound to join them.



Jim Bell is an astronomer, planetary scientist, and Professor in the School of Earth and Space Exploration at Arizona State University in Tempe. He has been a member of the science and operations teams of NASA robotic missions to Mars, the Moon, asteroids, and comets. He is also the President of the Planetary Society, the world’s largest public membership space advocacy organization.

Mindwalk

Kellie Takahashi





When I boarded the shuttle, the President of Mars and the CEO of Sky Mariners Corporation were there to send me off. Hundreds of reporters crowded around for a picture. So of course, the first thing I did when the shuttle took off was enjoy the silence. The city of New Horizon shrunk below me, faded to a single dot on the surface of the Red Planet, which soon passed out of sight as well. Finally, I was alone among the stars. In my suit, I carried my pocket computer and a tiny flash drive containing a project I'd worked on for months. I briefly considered plugging the drive into the shuttle, but decided not to. I had no reason to yet.

I didn't think this last test was necessary. I'd mostly recovered from my concussion after all those months. Sky Mariners Corporation told me they needed to be absolutely sure I'd be safe during mindwalking. Since I was the last of the three mindwalkers, nobody wanted to lose me. At least they'd agreed to my request to travel alone.

When the automated shuttle docked at the Callisto mindwalk station, nobody greeted me. I'd been here before, at least. I preferred to walk through the transparent passage to the operating room alone. The stars fascinated me every time. Jupiter loomed above me, colorful and swirling and luminescent. The only sounds were my footsteps and the distant hum of the gravity engine.

The metal doors automatically slid open. I entered the station's gray interior, which was dominated by a red-cushioned mindwalking chair. It reminded me of a discarded airplane seat, reupholstered and rewired.

"Ms. Delamere," said a male voice. A robot rolled out of a side door. It was pure metal, faceless and featureless, resembling a human's upper body mounted on a wheeled silver

cube. It had a clipboard tucked under its arm. "Call me Dr. Lee. I'll be monitoring your mindwalk for any mental abnormalities."

I shook its offered hand. "Thank you," I said.

"It wasn't the first time for the other two on Europa," said Dr. Lee. I didn't have a response.

It took a pencil out from the clipboard and made a note. "You may sit whenever you're ready."

Will I ever be? I shrugged and carefully walked to the chair. I sat down on the familiar cushions, feeling the rough fabric of the handles. I leaned back, letting my head touch the plastic headrest. My hair had been cut short again for this, and the cold of the plastic seeped into my skin. I shuddered.

Dr. Lee gave the whole system a glance and left into the side room. Right after the door slid shut, its voice emerged from the speakers on the headrest.

"Cara Delamere. You will begin your mindwalk in ten seconds. I will ask you a series of questions. Do your best to respond each time."

I looked at the ceiling and saw my large dark eyes reflected in the white lacquer. Then I closed my eyes.



Again I felt that sensation in my stomach of falling, then floating up through water. I couldn't feel the chair anymore. Waiting, I listened to my breathing, calming myself. I knew this. This was old territory.

"Cara, you may open your eyes," said Dr. Lee. "Tell me what you see. I am monitoring your brainwaves for confirmation."

I complied. My eyes adjusted to the gloom.

“The sky is black and filled with brilliant stars. I’m standing on the lip of an old crater—very wide, I can barely see the other end; it’s too dark. I’d be afraid to jump if I weren’t mindwalking. There are boulders scattered throughout the bottom. I’m guessing the ground is not even. No movement. Silence. I’m vaguely cold.”

I turned around and looked up at the sky again, my feet clicking against a few pebbles. A half-moon shaped Jupiter rises up on the horizon. Stately, orange, and swirling, it dominates the lower half of the sky. If I squint, I imagine I can see the orange, white, and red storms swirling around. Just above Jupiter, one white star gleams brighter than the others—the station where my body is.

A face floated up in my memory. Elizabeth, my fellow mindwalker, stands with me on Europa’s glaring bright ice. She’s laughing. It’s early in our training, and we’re drawing imaginary constellations that no one else will ever see—

“Very well,” said Dr. Lee suddenly. “The vision data has been collected. Now, please put your hand to your waist—”

“I know what comes next.” I crouched down and picked up a small gray rock. I held it in my open palm for a moment, then closed my fingers and squeezed. It disappeared as the automatic transport carried it back to the station and to Dr. Lee.

“Are we done now, doctor?”

It paused. “Yes. We’re done. I’ll take you back now.”

A wave of blackness clouded my vision. Numbness and coldness swept over me, and I found myself opening my eyes in the station room. Dr. Lee hovered next to the chair, shaking its head slightly. They’d really improved the lifelike quality of the robots.

“I’m sorry, Ms. Delamere. We can’t clear you for mindwalking. We’ve detected small abnormalities in your vision, specifically with the alignment of the stars. They’re very small, but still cause for concern.”

“What? That can’t be. There must be some mistake. I passed all the tests on Earth and Mars!”

“I can’t approve it. Again, I’m sorry. Sky Mariners will offer you another month of paid leave before you may be retested, but at this point in time it’s unlikely you’ll fully recover.”

Translation: I’d effectively lost my job.

“There’s nothing I can do?” I said at last.

Dr. Lee shook its head. “The shuttle is ready to return you to Mars. Please have a nice day.”

I barely noticed anything else as I left the way I had come. It pained me to look at the stars, knowing I’d be deprived of them once more.



On the shuttle, my pocket computer vibrated. When I turned on the holographic screen, it showed me two new emails. One was from my little sister, giving me an update on family news, hoping I was well, and telling me she missed me. The other was from an anonymous person. I knew what that meant, but curiosity made me open the message.

Cara,

Europa was not an accident! They did not let you go back. They will never let you go back. Say nothing about this.

I sighed and closed the email. No matter what security measures I added, someone always managed to get past. Fortunately, the number of conspiracy theorists who bypassed the filters stayed small. I didn’t need any more reminders of the deaths of my friends.

The Martian government built the ice drill on Europa using remote robots, but it turned out the robots kept freezing up after a certain period of time. When the government offered money for a solution, Sky Mariners responded.

The only people ever to mindwalk were Gabriel Ross, Elizabeth Hayford, and me. We trained for months, getting used to our new style of movement on the dusty Martian plains. If I hadn't been hit in the head by a falling rock at the Vallis Marineris canyons, I too would have been sent to Europa to work the ice drill. And I too would have died when the ice drill broke down and exploded.

A new message popped up in the inbox, interrupting my thoughts. I read it twice before the meaning sunk in.

Please don't delete this like last time. Why won't the Sky Mariners say anything about Europa? Bet they haven't told you either. I swear I'll pay you if you go find out and spread the word.

I slammed my hand down on the computer's power button and shoved it back into my pants pocket. For the first time, I wished there was someone else in the shuttle with me. Why did I continue to subject myself to this? I knew exactly what had happened. The ice drill had broken down, nothing more.

Trying to distract myself, I went to the galley on the back wall of the shuttle. I ordered a chamomile tea on the touchscreen and spent the next hour watching the stars. Perhaps this was the last time I'd see them like this.

Elizabeth and I had talked the most. The training was her first time away from Earth, whereas I had never left Mars. We traded stories: she told me about the vast, sparkling blue oceans of Earth in exchange for hearing about the red sand dunes of Mars. I wanted to hear about the constellations most of all. Civilization on Mars wasn't exactly old or coherent enough to create any myths or star-shapes, nor did we need them. Still, I liked the idea. One of these days, I'd have to make a personal map.

I saw my reflection in the shuttle's window. I couldn't get used to having my blonde hair close-cropped, though it had to be short for mindwalking. My cheeks seemed gaunter than they had months before. All these changes had taken a toll on me.

A high-pitched beep sounded as the engines started to rumble. I was entering Mars' space boundary. Crossing to the opposite window, I saw the floating silhouettes of the asteroid belt, still some distance off. It wouldn't be long to Mars once I passed them. On an impulse, I spoke aloud, "Emergency Stop Requested."

The engines rumbled, then died. I was floating among the stars and the silence. All around me, there was nothing but black space and white points of light, with the almost-rainbow streak of the Milky Way swirling around me.

Maybe the conspiracy theorists had a point. I should visit Europa once before Sky Mariners made me retire. It'd be far better than returning to New Horizon in defeat.

I took out the little flash drive and plugged it into the shuttle's entertainment computer port. It would only take a few minutes for the program to download and run. Sky Mariners had top security on their shuttles, but I knew what I was doing. I hadn't spent my recovery period idly. The engines roared to life and the shuttle turned. Gaining speed, it flew back the way I had come, towards Europa.



The shuttle flew past the Callisto station. Looking at the swirling surface of Jupiter, I saw that the shuttle was heading towards a blue dot that was swiftly growing larger. Even before the view below me confirmed it, I knew the surface was covered with ice. My friends had died trying to discover that ice's secrets.

Above Europa, the disused mindwalk station still floated: a white metal sphere with one long hallway for entry and exit. The shuttle flew up to one of the landing spaces, slowed, and stopped. The door slid open, revealing a silent hallway. I stepped out and ran to the central hub.

I was lucky. Sky Mariners had kept the entire station in stasis, just in case it could be used again. It took a few minutes for the mindwalk chair to turn on, but it worked. I sat

inside, ran through all of the steps on the armrest's screen. Ensure physical comfort, check the neural transmitters, start the connection. When the global image of Europa appeared, asking me to choose a location, I entered the coordinates of the ice drill.

Everything was ready. I closed my eyes and pressed the black button.



When I looked up, Jupiter covered nearly half the sky. Europa was bathed in an orange half-light that reflected dimly off the ice. My feet slipped on the surface as I shifted my weight.

I turned and found myself close to the borehole. The enormous drill loomed on my left, blackened and gutted. The top half lay on the ground next to its base. Bits of debris lay on the ground all around, some larger than me. No sound came, not even the wind.

I caught a flash of movement out of the corner of my eye. Only a hallucination, I thought, until I saw it again. Someone was walking in a circle on the other side of the drill.

No one else should've been there. I took a small leap forward, drifting with the weak gravity, peering cautiously. The person was a short, dark-haired man, dressed in a white jumpsuit without any other protection. He paced in circles, faintly muttering to himself. With a shock, I realized it was Gabriel.

"Hey!" I called. "Gabe, it's Cara! What are you doing?"

He ignored me. As he passed by, I caught snatches of his ramblings.

"...but if Mars is not independent then why...who controls it I will never understand..."

"He can't hear you," said a female voice in my ear. "Sometimes I can't hear him."

I whirled around and jumped back, flying a little farther than I intended. Elizabeth. It was Elizabeth.

She looked almost the same as she had before her departure. She wore the same white jumpsuit as Gabe. Her dark hair was cropped like mine. Her eyes, though, had a horrible vacancy as she watched Gabe continue his mutterings.

“How?” I gasped. “How are you still here?”

Elizabeth lifted her arm, pointed up at the mindwalk station, then let her hand fall.

“They keep us here. They’re watching us,” she said in a childlike voice.

“That’s not possible. The mindwalk can’t revive the dead. Are you...alive?”

“Am I?” She turned to face me. “First we saw strange things. Then our bodies stopped responding, sometimes. Then one day we couldn’t wake up. So we tried to wake ourselves up. Fire. Destruction. Alarm clock.”

I stepped back. “You self-destructed the ice drill? It wasn’t a malfunction?”

Elizabeth kept staring. Gabe walked and muttered in an endless circle.

“Elizabeth, please. What happened?”

“It broke the connection. Now we’re stuck.” She looked up. “Until they let us go.”

I shook my head in disbelief. It all made a sickening sort of sense. Mindwalking had never been safe, and Gabe and Elizabeth were paying the price. Sky Mariners would never let me mindwalk again. Not, at least, until they could get rid of the evidence.

Elizabeth’s image suddenly flickered. She stumbled back and gasped. “Cara? You shouldn’t have come. Get out, get out!” Before I could respond, she turned and ran away. I quickly lost sight of her in the dark.

Gabe continued to pace in circles. I turned around, blinking back unexpected tears. I hadn’t even known I could cry while mindwalking.

On the horizon, a small white light appeared. It moved quickly, ascending the sky towards the mindwalk station. Elizabeth was right. They had found me.

I took a deep breath and said, “Exit mindwalk.”

When I woke, I sat frozen for a whole minute, even though Sky Mariners was coming for me. After that, it didn't take me long to decide what to do. The station had a self-destruct protocol, in accordance with regulations, which could be activated through the mindwalk chairs. All three of us mindwalkers had the necessary clearance.

So here I am in the shuttle, at the closest distance possible, watching the station flash red during the countdown. Sky Mariners' ship arrived, but it's wisely keeping its distance. Perhaps they're trying to stop the protocol, but I doubt they'll succeed.

I'll never walk among the stars again. I've accepted that, mostly.

The lights are flashing faster. The countdown's almost done.

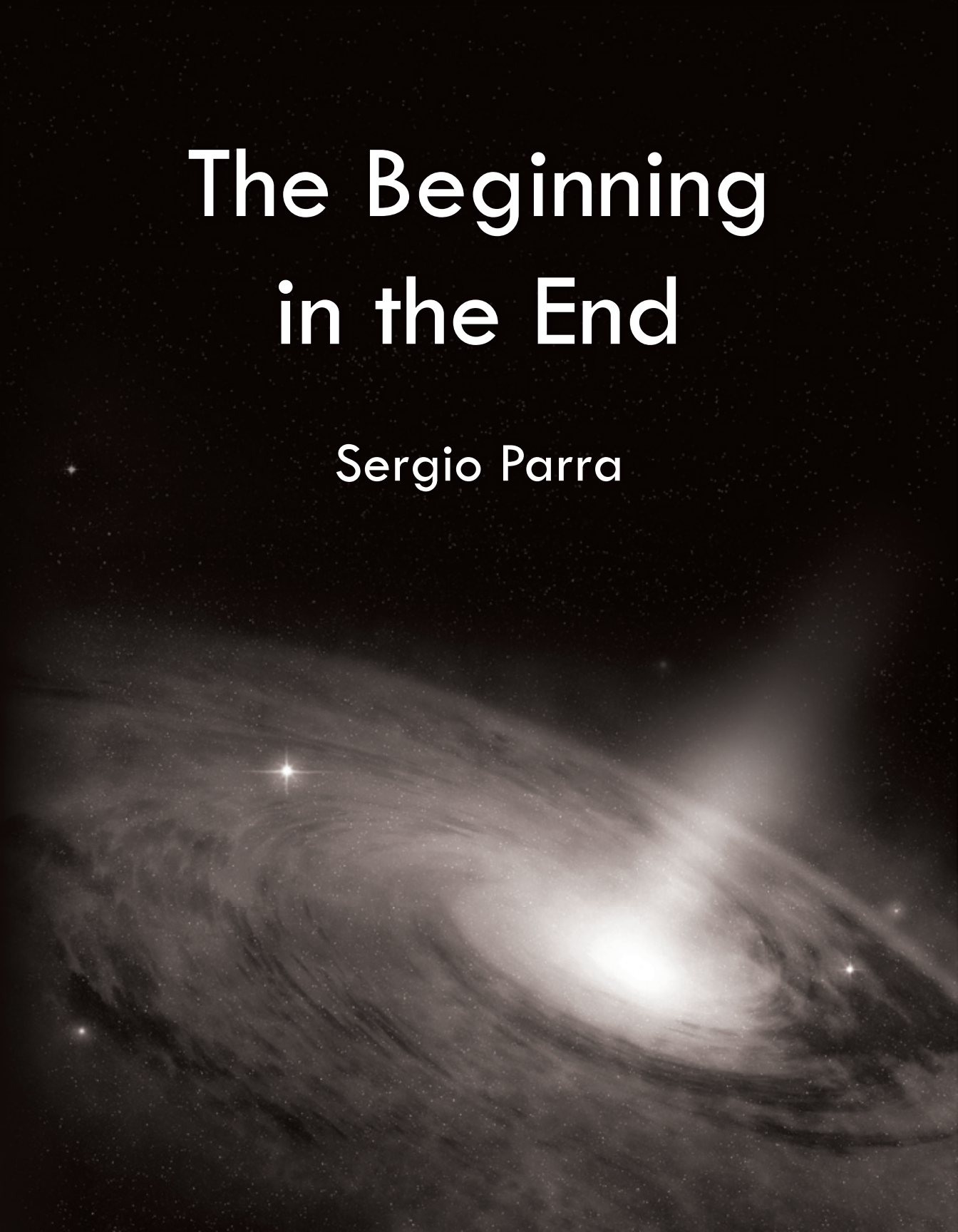
Three.

Two.

One.

The Beginning in the End

Sergio Parra





One second ago, he had been about to leave the post office. In an instant, he was thrown against the old tile floor, jarring his skull on impact. Time seemed to warp and slow down in foreboding silence. The air appeared to vibrate around him.

An intense and unbearable heat suddenly overwhelmed him, enveloping him in a hellish cocoon. He was sure he was on fire. He could smell the acrid scent of burning flesh, but he couldn't move.

Then everything around him exploded.

Adam sat up violently in bed, his disheveled brown hair matted with sweat. He panted heavily, shivering even though the room seemed stuffier than usual.

The world was dark.

“LUNA, turn the night cycle lights on. Accent the blue frequencies too,” he spoke out into the room, ripping off the covers.

“OK, Adam,” a disembodied female voice replied as the darkness gave way to a soft bluish-white light. “The temperature has also risen five degrees above your specified interval for this hour. Would you like me to bring it down?”

Adam groaned, rubbing his eyes. “Yeah, thanks.”

The muted sound of rushing air soon followed as Adam lumbered over to the nearest porthole, peeled back the aluminum blinds, and looked out over the desolate lunar landscape. He squinted as his eyes adjusted to the brightness. Earth, now a pale white circle, hovered in the inky darkness of space.

Three months.

Three months since he had discovered that he and the nineteen hundred and eighty-four souls aboard the International Lunar Colony were the last of a species that had once been growing at an enormous rate. He looked out into the sunlight, his mind wandering. Memories he had fought so hard to forget resurfaced like a submarine.

It always began with the goodbyes four years ago.

“Adam, could you get me the other bag of charcoal I left in the garage? I’ve still got a few steaks left to grill.”

Adam got up from the lawn chair. “Sure, Dad. Be right back,” he said, motioning to his friends sitting around him.

The August night was perfect. Warm, moist air clung to his face, the song of crickets and cicadas playing ambience to the laughter of the celebration. He knew he’d miss it. The conversation and sounds of silverware suddenly died down as the people heard the clinking of a wine glass. Adam’s father stood up to speak.

“Alright, I’ll be quick so we can get to dessert. But I’d like to thank you all for coming to support Adam. This sure means a lot to him. As you all know, he’ll be leaving us next week for the International Lunar Colony for the next ten years. It’s a rare opportunity that I don’t blame my fresh-out-of-college son for taking. I wish I could tag along, but then you’d all be deprived of my amazing steaks for the next ten years. Plus, I don’t know anything about terraforming technologies.”

The crowd laughed. Adam’s mother hit him on the arm playfully, guffawing.

“So thank you once again for coming and seeing Adam. Here’s to an amazing, out-of-this-world experience, son!” Adam’s father finished, slapping his smiling son on the back.

He clenched his teeth as the memory dissolved, another memory fighting its way to the surface. He fought back as hard as he could, but it seemed to have a mind of its own.

The most painful one. The most recent one.

The words stung. Adam blinked repeatedly, shaking his head in disbelief. The noise level in the large conference room skyrocketed with the heated tones of four hundred sixty-seven Americans.

“What does he mean, ‘nuclear wasteland’?” someone asked.

“It’s the latest transmission we got from Houston! We’ve tried to reply for the last hour, but it’s not going through! There’s nothing on the other side!” an officer replied, shouting above the noise.

Mike ran up to Adam, panting and grabbing him by the shoulders.

“I’ve heard all the other sectors got the same message. Each from their own country’s leader. The Japanese, the Canadians, the Indians, the Europeans, the Russians, all of them. If that’s true, then they can’t be lying. We’re the last ones, Adam. We’re the last of the United States of America.”

Adam’s eyes were lost in space. Sound was only a blur to him. The world seemed to tilt.

“Did you hear me, Adam? Earth’s going to be a distant memory. I...I didn’t even get to say goodbye. I—”

He shook Mike off and burst through the crowd of confused people, his eyes frantic.

Bolting out of the conference room, he ran to the empty Observation Platform.

He could feel the onset of an anxiety attack, but through pained breaths he shouted, “LUNA! I need image feeds from Atlanta, Georgia, in the United States!”

He heard the familiar thrum of the massive telescope as it began to rotate.

“Come on, come on...”

The wall next to him lit up as the telescope rapidly began taking images of Earth, the only home humanity had ever known. Pictures suddenly flooded the screen.

A shriek tore itself from Adam’s lips.

He fell to his knees.

He cursed himself, shaking his head. Reliving emotional pain was not going to help the last of humanity move forward. In the three months since the world had gone to war for the last time, a lot had changed in the ILC. He had to be strong. He had to keep going.

Fully awake and focused, he walked over to his small dresser and picked up his tablet, which had been charging the night before.

The launchPad's screen, sensing his movement, lit up, the glass and LEDs twinkling in the low light. Pressing his thumb against the screen, the half-a-kilo tablet read his biometrics, evaluating his medical status in a matter of seconds before opening up to the main interface. He looked at the time.

05:34 AM, GMT (Greenwich Mean Time)

Next to the time, he noticed the bars indicating his wireless connectivity to the Lunarnet were abnormally low. Accessing public data aboard the ILC would be very slow today. He groaned.

"Welcome, Adam. Your blood pressure and heart rate are slightly elevated as compared to your normal range, but I suspect it's momentary. Maintenance is working on the connectivity issue. Projected finish time is set to about 02:30 PM, GMT. Until then, please be aware of lapses in connection," a familiar disembodied voice spoke.

"Got it. Thanks, LUNA."

Despite it being early in the morning, light already poured through the portholes of his chamber, casting a halo around the aluminum sheets that kept his room from being illuminated—otherwise it would be bathed in light nearly every hour of the day.

He was already used to the extremely long hours of sunlight where they lived near the South Pole, amid the Clavius Highlands. The locale was rather nice.

The International Lunar Colony was essentially a fortress at a mountain's base. Or rather *in* a mountain's base. To reduce the dangers of cosmic and solar radiation, the colony had been built into the highlands, using concrete derived from lunar regolith. The position made for amazing views—he had a bunch of stunning pictures he was at

one point hoping to take back to Earth to show his friends and family. Before everything had changed.

Moving his hand above the tablet, Adam pulled up his planner. Meetings filled up soft red rectangles from 6:30 AM to 5:30 PM.

Sighing, he motioned the launchPad off and dropped it onto his cot. The reduced gravity had been interesting to adjust to, but after a few years, it had become second nature. However, it still fazed him a bit to be able to jump incredibly far and to see things fall a little slower than they normally did. He shook his head in weary amusement.

“LUNA, get the steam shower water ready.”

Adam undressed and stepped into a closet-sized compartment, completely enclosed in warped glass. Once the door closed, a fine mist, steaming with solar energy, began to drench him. Five minutes later, Adam was stepping out in a thin white towel when LUNA’s voice spoke.

“Adam, you have an incoming call from Mike Thompson. Do you want to take it?”

“Yeah, put him through.”

A second of silence followed as LUNA streamed the call from his tablet to the room’s audio systems, then a male voice spoke.

“Hey, Adam, I’ve got a few ideas on the agriculture systems we were discussing yesterday. I was wondering if you wanted to meet in the dining hall for an early breakfast before the meetings.”

Adam turned to face the ceiling as he wrestled on a pair of pants.

“Sounds good, Mike. I’ll see you there in a few minutes.”

“Great. Bye.”

Adam walked over to the steam closet and dropped his towel inside before closing it.

“LUNA, set the steam closet to recycle.”

A soft hum emanated from the closet as water vapor and liquid water were recycled back into the system for reuse. The water lost outside would be recycled through the air vents. They couldn't afford to waste a droplet. On the Moon, water was gold. Adam grabbed his launchPad and left the room for the dining hall, his bare footsteps echoing softly on the lunar silica tiling beneath him.

The dining hall was adjacent to the U.S. sector crew quarters, built to seat three hundred people at a time. Long rows of large portholes that looked out onto the lunar landscape lined the walls of the hall, casting elongated shafts of light into the grand room. A thin film of lunar regolith on the glass scattered the light. The hall, though operated by a small crew 24/7, sat empty and silent, as most of the U.S. crew was still asleep. The muffled sounds of banging pots and voices occasionally broke the stillness.

Adam looked down the hall and saw Mike sitting at one of the long tables. Ruffling his still-moist hair, he walked over and sat down beside him. Mike's titanium plate had a small red apple and a piece of whole-wheat bread with what looked like brown mush spread all over it. A steaming mug of coffee was in his hand.

"Is that what they're serving today?"

"Yeah. I've always liked their bread though. And the naturally made peanut butter is really good too. You didn't get that stuff so easily back on Earth. It's the coffee though," Mike said with a gag, "3-D printed coffee beans are never a good idea."

He took another sip, grimacing. "But I need the caffeine."

Adam chuckled. "I guess I'll get the same, then. Minus the coffee." He got up and came back a few minutes later with another titanium plate and a glass of orange juice.

Mike sighed as he looked out the porthole. "There's really no point to us being here now. Houston's gone. The government's gone. Everything is gone."

"Work is the only normal thing left in our lives," said Adam. "I'm surprised we've only had a few psychological meltdowns and suicides. Mike, we're the last humans in the universe. That is, after anyone still alive on Earth eventually dies from the nuclear

hell they're in. It's terrible to think about. So we do anything we can do shy away from it. Normalcy, however we can get it, gives us the denial we need to cope with this... isolation."

Mike squirmed uncomfortably in his seat at the notion.

Adam continued talking. "And I hate all these ILC Council meetings, too. Being among the two chosen to represent the United States was no honor. Do you know what it's like to have to keep a stiff upper lip and maintain the illusion of composure? It's taxing. I've had nightmares ever since."

"Yeah, I guess. I've just tried to avoid thinking about it. But I can't do it sometimes, Adam. I whenever I zone out, I start thinking about Allie and the kids. I start thinking I should have died with them..." Mike's voice cracked.

Adam leaned over and gripped him by the shoulder in a gesture of comfort. A few seconds of pained silence passed.

"Enough of the morbid talk. We can't afford to think like that. The meetings start in a bit. What did you have to show me?"

Mike put down his coffee and took out his launchPad. Once his biometrics were accepted, he pulled up a few electronic sketches and images.

"Well, it's a good thing we had the terra-platforms developed two years ago. As we agreed, we can use pre-existing systems and adjust them to fit our needs. Since we already use the NASA-built VEGGIE facilities for mass production of wheat, rice, potatoes, corn, soy, and other vegetables, we can use the terra-platforms to simulate other biosystems and better grow food specific to certain climates, like fruit trees and herbs. Oaks and maples can be grown from the seeds we have stored from research a few years ago, too."

"Where are you going to get the nutrients to feed the extra vegetation? The optimized fertilizer we shipped in last month can't last forever," Adam asked between sips of orange juice.

“Carbon dioxide from human exhaust and combustion of waste-generated methane can be channeled in and regulated as needed. To get cheap nutrients, we can work out a deal with the sanitation department and get some sort of sterilized, processed human waste.”

“I don’t think people will be too excited about the fact that their food is grown out of crap,” Adam pointed out.

“Well, it’s not like we have any other options. We have to recycle as much organic matter as possible.”

Adam looked away and swallowed a bite of his bread. Doubt clouded his thoughts.

“We have so much ahead of us, Mike. Working out how to milk everything for what it’s worth, from lunar resources to...well...our own crap. Restructuring government, rebuilding society. It’s going to get a lot worse before it gets better. It’s too much sometimes.”

A few people were already filtering into the dining hall.

“I know. I was just thinking about feeding all these people,” Mike said, gesturing to them. “Agriculture and 3-D printing can only take us so far. We can only hope that the ILC Council will agree to lend us the resources to build a few more terra-platforms. There’s plenty of lunar regolith to keep making concrete, titanium, and glass,” Mike said, pointing out through one of the portholes.

“Any progress on the meat issue?”

“Well, we do have lab-grown stem cells from chickens and cows. So we could theoretically 3-D print chicken breasts and beef steaks, but that’s still a long way off. So for protein...” Mike paused as he gestured to his launchPad.

Adam gaped. “No....”

“Insects are rich in protein. Besides, it’d only be a food base. Come on, Adam. We already do the same with algae and certain vegetables we don’t have anymore. Add a lot of

natural flavorings and you won't be able to taste the difference. Besides, crickets and the like reproduce quickly, and we can store them in larger amounts."

Adam fought hard to swallow his bile. "It'll be hard to convince the Council, but I guess I see your logic. As gross as it seems. We'll have to build more 3-D printers for food then."

"I know. But I bet the other committees in the Council also have wish-lists. Who knows when we'll get all this done," Mike snorted pessimistically.

By then, the dining hall was alive with people milling around, getting food and sitting down. Adam pulled out his tablet and summoned the time display.

"Better get going, I guess."

"Yeah, alright. Wish me luck, then," Mike said as he got up. He noticed Adam didn't budge. "Aren't you coming with me?"

Adam found himself staring out through the porthole next to him, lost in thought. He snapped out of it.

"Oh. No, I'll catch up. See you."

As Mike walked away, Adam found himself staring back out of the porthole. Back at Earth.

It had been a month since he had seen the oceans.

After seeing the images of his obliterated home, he had refused to look at Earth for weeks. Then one day, he'd brought himself to look again. The blue planet, once vibrant in hues of sapphire and earth tones, seemed pallid and deathly. Pale clouds began to cover the surface for increasing periods of time until one day, when the surface disappeared beneath the film of white.

He closed his eyes and tried to imagine the smell of the ocean and the rush of the breeze. The memory was increasingly difficult to summon. Nostalgia once again fought its way into his mind, seizing it unrelentingly. Family memories flooded him.

His heart broke every time.

Life would never be the same. He could still grow grass here, he could still grow trees and bask in the Sun's rays if he really wanted to. But the blue sky was gone forever. The endless ocean was gone forever. His family and everything that he had ever loved were gone forever.

And then, like every time, he became aware of the life around him.

Humans were a peculiar race. All these people around him had also lost loved ones and the world they once knew. Life as they knew it was gone. And yet here they were, moving on, depending on one another. Laughs from a background conversation caught his attention.

They were resilient.

Despite the pessimism that often wracked him, Adam realized that there was hope as long as there were humans to experience it. They would start over. They would continue the legacy.

This was not the end.

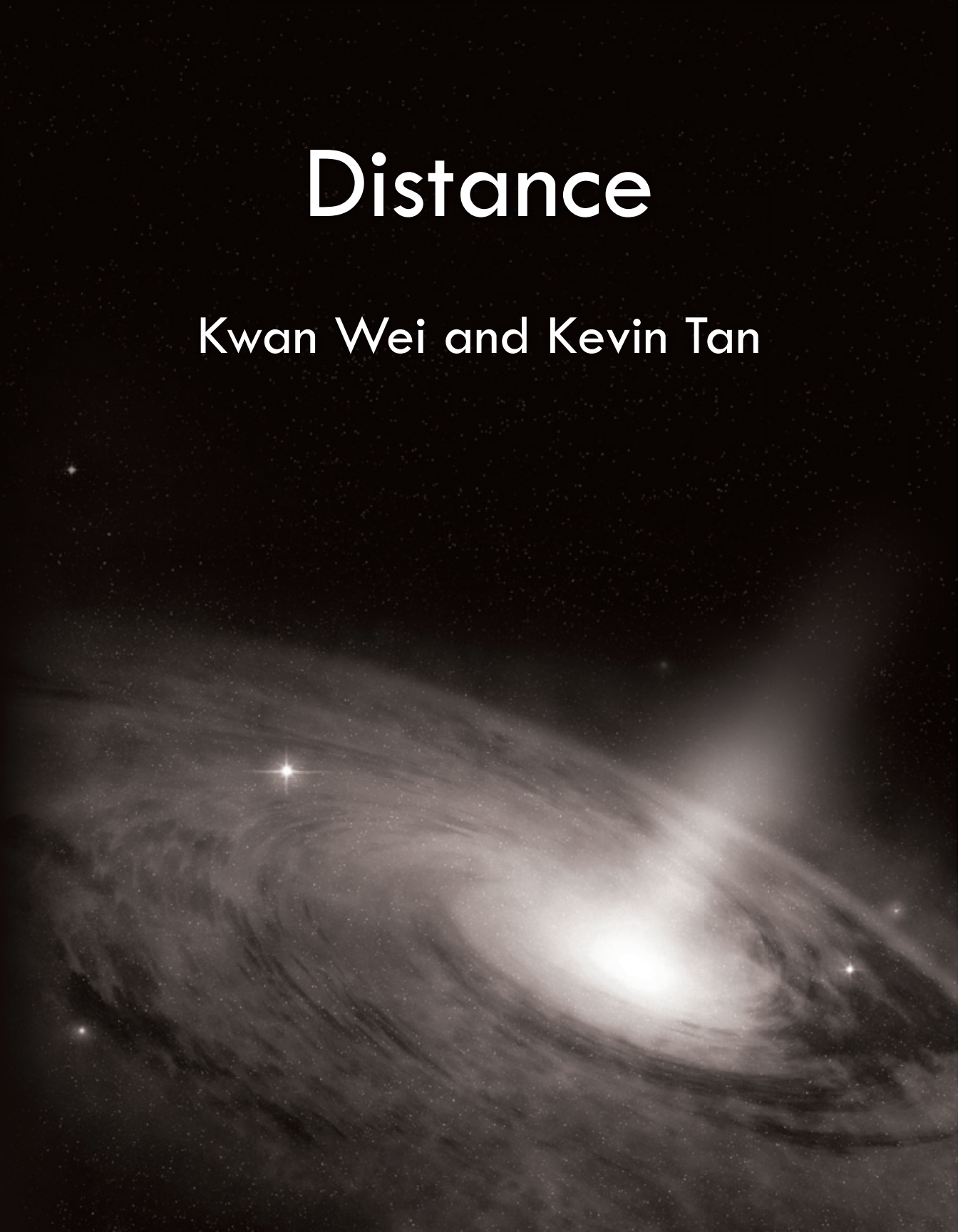


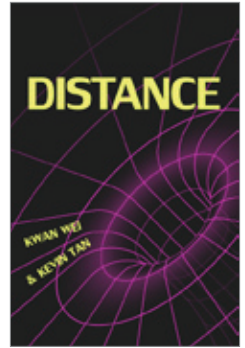
A casual bystander waiting for his breakfast happened to glance over at a lone crewmember, sitting at a table, staring out through one of the portholes.

Sunlight illuminated the man's face as it broke into a smile.

Distance

Kwan Wei and Kevin Tan





Prologue

Footsteps punctuated the vacuum-like silence of the sterile room. The heaving sound of muffled breathing resounded in the room as the visitor approached the bedside. The stinging smell of disinfectant purged the room of any warmth, leaving it a muted haven.

A hand reached out. The hand of a younger man still filled with vitality.

“Son?”

“Fa...ther....”

The voice trailed off as the wrinkled arm of the patient gestured towards his bedside. A worn out Casio F-91W lay there. Seemingly reading the thoughts of the patient, the young man put on the watch.

“I wish I had more time. I wish this didn’t happen at all.”

“It’s all right. It’s all....”

The voice slowly lowered itself to a whisper. Only this time, it wasn’t fading. It was ending.

The wrinkled figure lay taut in the bed as the younger man sobbed violently, gripping the dead man’s hands tightly.



Space, a place containing infinite nothing. My wife used to joke with me about how oxymoronic that idea was. Well, it was kind of true. You don't hear. You don't see much. It's nearly blinding in its purity. But most importantly, you're alone. Traveling through the cosmos in your little tin can, the stars that were once the beacons of hope for making wishes become distant companions in your voyage.

Honestly, I don't even know why I took this job. Oh wait, right: it was a childhood dream. Ever since billionaire industrialist Elon Musk figured out how to make reusable rockets, a new Space Race had dawned. It wasn't just about the Moon anymore. It was about colonization. Every kid wanted to be an astronaut. They imagined themselves as Han Solos or Captain Kirks, but of course, like any childhood dream, it was an exaggeration. Space travel was less of science fiction and more *Heart of Darkness*. Only this time, the exploited were the astronauts themselves.

"Officer Columbus, please verify that your location sensors are functioning."

"Copy that."

Mission Control disturbed my train of thought as I adjusted several switches on the dashboard.

"That's a negative, Mission Control. It appears that the location sensors have malfunctioned."

"Stay where you are, Officer. We'll dispatch a ship to get you."

"No. I can do it. I've scouted this star system for the past week. I can remember my way back."

"Sir, I would advise that you...."

With the flick of a switch, the voice turned to static. At last, no more disruptions.

Space travel used to mean something. It used to be about discovering the unknown, but exploration had been replaced with corporate interests. My ship wasn't a swash-buckling sedan of the stars; it was a standard issue Class C Weaver - 09. I lovingly called it the "Mustang"; with its powerful nuclear engines, it reminded of a classic muscle car.

It's funny—no one understood what “Mustang” meant till I pulled out my T-Shard (TS) to dig up some pictures of the obsolete, gas-guzzling original Mustang. Cars weren't needed any more; the inter-city hover drones delivered you to your destination in half the time of any vehicle on the ground. Fortunately, the TS was capable of projecting the images in all their three-dimensional glory. Once they see the images, people understand exactly why I named my ship after an antique.

It's been five years since Mustang and I have been doing this job. With her, I was given the chance to travel in space. With one condition, though: I wasn't an explorer, I was a scout. Planets weren't studied for their intrinsic value or characteristics; they were selected solely on the basis of their ability to support life. If a planet was deemed easy to terraform, then my company, Galaxy Holdings, would send their engineering and construction crews to begin work. Otherwise, the coordinates would be sold to their competitors for a profit. It's funny how colonialism had resurfaced in the modern era. And with no natives—or should I say *aliens*—to put up a fight, the human empire was unlimited.

But that's not to say that it wasn't dangerous. Sometimes planets that looked habitable harbored sand storms or severe weather disturbances. Unlucky pilots who ventured too close for an in-depth study could be stranded forever. My old friend Gogh was scouting a planet once, and amid his glee, he didn't notice that he was headed straight for an asteroid belt. When the company went to look for him, they found only wreckage.

Yeah, it's a risk. But what choice do we have? Financially, it was worth it: one million dollars for the discovery of a Type A Planet. That was the dream of every scout. Without us scouts, the exponentially growing human race would have resembled bacteria on a Petri dish—beings that continued to reproduce without any awareness of their limitations. That was how Earth was decimated in the first place. I remembered taking my son Edison to visit once during the holidays. A planet covered almost entirely with water. We would hear the occasional rumor about how there were still some scattered tribes living in what was left of the landmasses.

Edison used to ask me why the government didn't help those people. How could they survive without the technology that we possessed?

I brushed off those questions. He's a good kid, but too idealistic. Why would they care? Like the Earth, those people are relics of the past. Maybe if their land contained some precious mineral, aid might find its way to them.

My thoughts lingered on Edison. I hadn't seen the little man for a month, since his birthday. I gave him my family heirloom, the Casio F-91W. What's that, you ask? Well, it's a watch. It's one of those little timepieces you strap to your arm. It's a joke, really. These days, when you can have information broadcasted to you through your TS or your AIs, a watch is a bit of an anachronism. But hey, anachronisms can be valuable. The last time I checked, the Casio was worth a luxury apartment on a Type A Residential Planet. A natural, breathable atmosphere and a planet loaded with an abundance of greenery. Definitely a great place to retire.

As the Mustang cruised ahead, I noticed a planet ahead of me. I didn't notice it before, but it resembled Earth Mark 2, or in scout lingo, Mars. Back in school, we were taught about the potential of Mars. Ice storage and an interior filled with latent oxygen made it a habitable planet and the first Type A used for human expansion. This new planet, looming dead ahead, gave me those same vibes. I pulled the lever that released a probe into the planet's atmosphere.

"Scanning is complete. Analysis is as follows: atmosphere contains twenty percent oxygen, one percent carbon dioxide...water vapor concentration at one percent indicates high chance of water stores or ice on this planet."

A smile lit up my face. My big break! A Type A Planet! I would never need to spend time away from my family again.

The probe's robotic voice started to speed up, as if to express exasperation—or fear.

The Mustang started to shudder violently.

"Planet is incapable of sustaining life. Black hole is approaching the planet."

It can't be. What were the chances? A Type A planet sitting in the path of a black hole? I printed out the probe's schematics to cross-reference the data. It didn't look good.

While the black hole wouldn't approach the planet, it would hover close enough to pull apart the planet's surface. Who would want to live next to a tsunami?

Oh wait, I'm right beside the tsunami.

I struggled to the accelerator and kicked off the throttle. Just my luck: the nuclear engines have jammed. I must have used up the coolant and forgotten to refill it. Greed and ignorance had cost me my caution.

I banged the intercom switch continuously, but it only emitted static. The black hole must be affecting my communication wave signals!

My mind hastily recalled the lessons I was taught back at the Academy. Never approach a black hole. Always conduct location scans. No one figured out how to survive or even escape a black hole in close contact. I guessed I was going to be the first.

I looked at the bare spot where my watch used to be. It's funny—at the end of your life, all those precious material possessions seem so fleeting. My mental images all hovered around Edison. The soft hair, the innocent eyes that shone with curiosity. That was my son.

And I didn't even get to say goodbye.



"Get up, loser!"

Little Edison pulled himself up. He staggered towards the burly boy ahead of him.

"Shut up, Connor!"

A badly timed punch landed straight into Connor's palm as he muttered menacingly.

"You're a moron, Edison. You think your dad's so great? Then where is he? In the stars? He's no space cowboy. He drove straight into a black hole like a wimp!"

Spit landed in Edison's face as he felt his body being thrown forward.

Footsteps shuffled away as Connor and the crowd that had gathered disappeared. Edison dusted himself off as he felt something warm slide across his cheeks. As he brushed it aside, he found out what it was. It wasn't blood. It was tears.

He felt a shadow loom over him. It was Marie. She offered him her hand as he got up.

"Don't worry about Connor. He's just shooting his mouth off."

"But what if it's true? What if my dad really is gone?"

"It was a black hole that he got sucked into, right? Well, black holes could be wormholes, and maybe your dad just traveled to another place. He'll make it back, right?"

"I don't know. Every day when I get home, Mummy's just crying. When I ask her why, she says its nothing. I...I love my Dad, Marie. Where is he?"

"Well, have you tried T-Chatting with him?"

"What's that?"

"It's a chatting service that allows you to project yourself three-dimensionally to other people via holograms. T Corp says it works in space too." Marie pulled out her TS to show how it worked.

Edison fiddled with the gadget for a while before a smile flashed across his face.

"Thanks, Marie!" Edison rushed forward to hug Marie, and her cheeks flashed red.

Edison sprinted back home as he fiddled with his TS and connected it to his camera. Time to send Dad some transmissions, Edison thought as he began recording.

"Hey Dad, it's me, Edison. Are you coming back soon? School's been okay, I guess. Connor is...."



It's funny how a crisis plays out when you're inside of it. Usually, when you read a report about some disaster, you feel trepidation and fear because you didn't experience it, then your imagination cobbles together something that exaggerates your already-heightened anxiety.

When I was being pulled into the black hole, I didn't feel my ship getting torn apart, or anything really (thanks to the reinforced alloy hull, I guess). It was more of a light show. I saw stars whirling across my field of vision. The Type A Planet? It orbited the black hole several times itself.

What happened next was unexpected. The black hole, yawning open like a giant mouth, swallowed the Mustang. I remember how she contracted and squeezed herself in. I was swallowed too—legs first, head last.

The Mustang got pretty distorted. My heart ached as I heard her hull scream as it warped.

Once the Mustang vanished into the black hole, I saw repeated images of her flashing before my eyes. I felt nervous joy and exhilaration, like the first day I got my license. It was heavenly. Was this my near-death experience?

I remembered seeing a bright light at the end. It was white at first, but as I neared it, it seemed to turn yellow. Was it the Sun?

All of a sudden, I felt a sensation like the Mustang had torn through the tunnel that had ingested it. She was slowly gaining some form of stability.

I quickly pulled out my TS, turned off Space Mode, and began scanning for any nearby network connections. There was bound to be a friendly Galaxy Holdings satellite somewhere around here.

Yes. Wait, something's weird. It says on the screen that I have sixty T-Chat messages. I rarely use the service at all. I started with the first recording.

"Hey Dad! It's me, Edison...."

My son! He must have been frightened. But sixty recordings! Silly boy....

But fear gripped me as I moved through the clips. Edison was aging. His skinny frame slowly developed into the musculature of a grown man.

“I graduated today, Dad! I’m going to be a pilot, just like you....”

“This is my wife, Marie. She’s pretty, right? And look over here? Say hi to Grandpa!”

I felt numb. Edison looked just like me and the cute toddler over there. Could it be?

I checked the calendar application immediately and it stunned me.

Seventy years had passed.

I hastily pulled back the last transmission, which read 2120. Edison must be seventy-eight years old now. But I’m still forty-five?

I pieced together my thoughts and it slowly dawned upon me. That wasn’t just a black hole. It was a wormhole. I didn’t see some beautiful light show. I was losing years. Seventy, to be exact.

I launched my back-up probe towards a nearby planet.

“Pluto, the former planet....”

I was back at my home solar system! I hurriedly rushed to the engine room to start up the back-up nuclear engine manually. It was time to go home.



The old man struggled to get up from the park bench. He always detested the jellylike artificial benches. Why couldn’t they be made of metal like in the good old days? He had to remind his senile brain that metal was a precious commodity used to make spacecraft and other expensive corporate contraptions. He was looking at his antique Casio watch when a voice disturbed his thoughts.

“Now we bring you today’s top stories.”

It was another one of those annoying news transmissions sponsored by the faceless corporations. Usually they were a front for product placement, but occasionally factual reports were given.

“This morning, an obsolete space craft, Class C Weaver - 09, appeared in Earth Mark 2’s airspace. This model has long been decommissioned in favor of more advanced interstellar ships. NASA has indicated that the pilot of this particular craft, Rick Columbus, was thought to be deceased....”

Father?

Shock and awe gripped the old man as he looked up toward the sky. He saw the Weaver cruise by, tearing and screeching through the air. Bystanders had covered their ears and were looking up in trepidation.

The old man felt a piercing pain in his chest. His legs gave way.

“Wait, are you okay? Hey!”

“It’s...the...Mustang....” The old man continued to mutter as a crowd slowly formed.



My memories were still rather hazy when I woke up in some kind of futuristic bed. The bed was floating, and wrapped around the bed was a floating table. A man dressed completely in white—the medical officer, I assumed—seemed to be evaluating me.

Another man dressed in a corporate suit approached me. Apparently suits never go out of style with corporate people, not even in the future.

“We thought you were a myth, Mr. Columbus. We’re so sorry that we have to lay you off at a time like this, but you won’t be able to pilot any of our modern ships. In order to be entitled to your severance package, we’ll need you to participate in some tests.

Your experience in the black hole could provide extremely valuable information to the company....”

I half-listened to the corporate drone as I slowly recalled what had happened.

My ship, it was shot down by the authorities and then....

I must have been knocked unconscious as it crashed.

“Where’s my son? Where’s my family?” I hollered at the frightened man.

The door opened hastily as a young man entered the room. My son?

“Edison!”

“No, that’s my father. Grandpa, you need to come with me, quick!”

Epilogue

I followed the young man, rushing to another ward. I felt a strong gush of sadness and dread as he opened the door. I saw a wrinkled old man lying beneath the sheets.

“Son?”

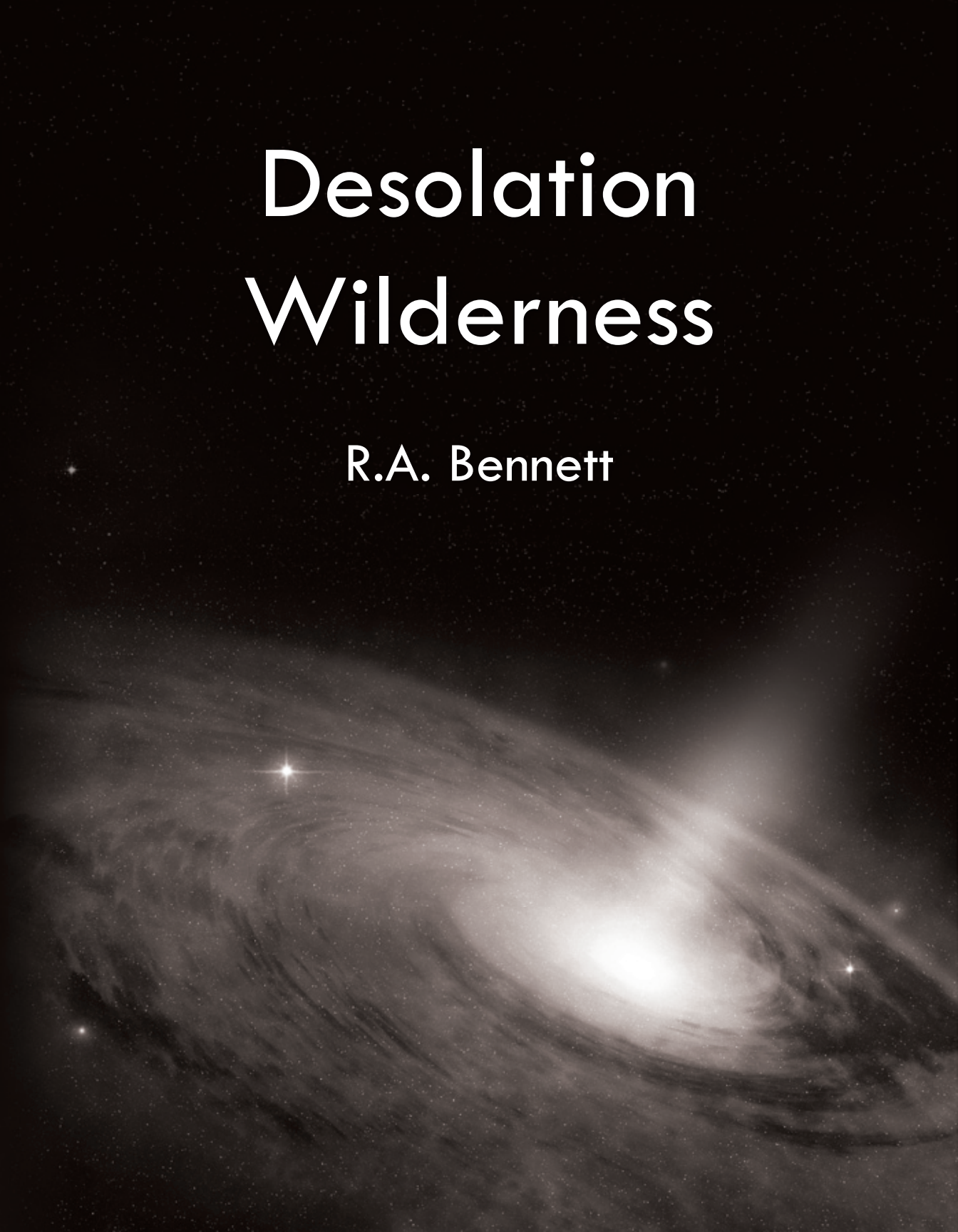
“Fa...ther...”

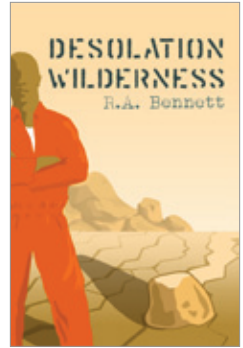
The voice trailed off as the wrinkled arm of the patient gestured towards his bedside.

On the table lay a worn out Casio F-91W.

Desolation Wilderness

R.A. Bennett





The bus rattled up and squeaked to a stop. Inside, several men and women in baggy orange clothes were staring at their sneakers or gazing blankly at the backs of the seats in front of them. The bus had no windows out of which they could glance to mark their location, and no back door through which to escape.

It was a dark shuttle to a new life on a desolate planet.

They rose from their seats in unison, and one by one they began to step out, squinting, into the desert. Omar watched as everyone in front of him filed into the aisle of the bus and shuffled out through the vehicle's only opening, a sliding door that was currently receiving a blinding glare of light from outside. Omar too, in time, stood and waited for everyone in front of him to disembark, and slowly made his way to the front of the bus.

One foot down on the dust. His gaze pierced through the ground below.

Another foot down. The rest of the group was gathered in front of him, facing the bus. He sniffed the stale air and turned around in time to see the sliding door creak closed. The old man inside coughed along with the engine, and together they looped back around and drove off in the direction they had come from. Omar shut his eyes to keep the swirling dust from getting in.

When he opened them again, the rest of the group was already moving past him in a herd across the cracked and broken patch of dried mud the bus had just vacated. As his eyes adjusted to the white sun above, the scene before him gradually put itself together.

"What has this world come to?" he mumbled.

He walked forward where the land was now perfectly clear to him. A vast and endless range of grit and vacant faces lay before him, unchanged by gusts of biting wind. The grit occupied a desert whose whereabouts were unknown to anyone there, and the faces had gathered under various large makeshift tents or several small fire pits where they either slept or sat expressionless on the bone-dry sea. Several people talked quietly, with long pauses between one sentence's end and another's beginning. The group that had joined him on the trip was now dispersing into these pockets of poor and pitiful people, most without a word, and settling down to sleep under a tent.

This was the life given to criminals. The process was explained to all of them quite clearly before their departure: they would be shipped off to some remote location with no mention of where, and with nothing but a uniform and their name, and they would have to try to survive on their own. At the end of each day, a truck would drop off buckets of water and fruit and pick up anyone who had died or was starting to lose their mind.

As Omar's eyes swept over the scene, they locked on a ragged-looking woman with frizzled black hair and sun-dried skin. The orange shirt everyone was given to wear was wrapped around her waist, and the white tank top in its place was covered in patches of dust and a few old bloodstains.

She pointed at him.

"You there," she called. "Come on over, now, don't just stand there trying to look heroic."

He sniffled again and walked toward them. The woman was leaning against a tent pole and watching him, as were the three other people sitting nearby. He traipsed over to them and she held out her hand.

"You look like you enjoy a little drama from time to time," she said, barely smiling.

"Name's Rachel. This here's Marco, Lola, and Nick. You'd be wise to stick with us if you want to live out here." She had the slightest drawl in her voice.

"Why's that?" asked Omar.

“Most everyone else out here’s just ‘bout given up on it all. We’re the only ones left that have any sense of optimism.”

Omar looked at her for a moment.

“If you guys are trying to hatch some kind of escape plan, I don’t want any part of it,” he said gruffly.

The others chuckled.

“Poor fella,” said Rachel, placing her hand on his shoulder. “We ain’t interested in second chances around here. As you’re well aware, this is where people come when they’ve been dealt a bad hand and didn’t bother to fold when they had the opportunity.”

Omar took a few steps past the tent and looked upon the rest of the colony.

“Death Valley’s gotten a lot bigger over the past fifty years or so,” he said, only half facing them. “Doesn’t mean you couldn’t make it out of here if you really wanted to.”

“Now hold on,” piped the man called Marco. “Are you tellin’ us that you know where we are?”

Omar turned back around and gave him a stern look.

“You *don’t*?”

“The hell are you—of course we don’t!” Marco shot back. “How is anyone supposed to know where we are if ya can’t even see past the bus? I didn’t even know it was a desert ‘til we got here. Thought it would be some kind of camp in the mountains somewhere.”

Nick spit on the dust below. It was the first time he had moved since Omar got there.

“I’m guessing that goes for the rest of you, too?” asked Omar.

Everyone nodded. Omar rubbed his forehead in frustration.

“Jesus Christ,” he uttered. “Doesn’t anyone pay attention to anything anymore? You can’t tell me you’ve never heard of the Sailing Stones.”

They looked at him.

“The Sailing Stones of Death Valley? The rocks in the desert that have mysteriously moved over time? Like that one right there?”

He turned and pointed to where he had been gazing a few moments before. A rock, flat on the bottom but jagged everywhere else, sat twenty yards away. Stemming from it was a trail that led off toward the rest of the desert.

“We always assumed that was done by someone here,” mused Lola.

“It’s the wind,” replied Omar. “I took my kids here over twenty-five years ago. When we got back I looked it up. People still aren’t sure, but many are positive it’s the wind.”

“Dandy,” said Marco. “But how does that tell you that we’re—”

“And it’s flat here,” Omar continued. “And I mean *flat*. Not once did I feel that bus go over any hills or bumps or anything.”

“Yer full of crap!” Marco stood up and stared at Omar. “First you tell me you took your kids to see a goddamn desert for a vacation, and now you’re saying you can *feel* how straight the land is? Five minutes out here and he’s a lunatic already.”

“What the hell is wrong with taking a trip to a natural and untouched part of the Earth?”

“It’s a desert, for God’s sake! It’s untouched for a reason! No one wants to visit a desert!”

“You can find beauty in anything if you just open up your eyes and see it differently,” said Omar calmly.

Marco squinted at him and laughed quietly.

“You sure know how to pick ‘em, Rachel. Why do you always end up with the crazy ones?”

Rachel ignored him and stepped in between the two men, facing Omar.

“Look, pal,” she started slowly. “I’m sure you’re a real smart guy and all....”

Marco chuckled again.

“Forget it,” said Omar. He walked into the tent, found an unoccupied space in the corner, and slept.



He woke to the sound of an engine humming outside. Looking around and seeing no one else in the tent with him, he rubbed his eyes and stepped out.

It was almost dark. The sun had recently slid below the horizon and shot out a collage of purples and oranges in its wake. Groups of people huddled around the fire pits watched as a truck pulled up, and half a dozen men got off and started unloading kegs and paper bags into a shed off to the side.

“You guys are building up quite the reserve in there,” said one of the men. “What’s the point of saving it? Don’t believe we’ll keep coming back here every day to feed you pathetic bunch of scoundrels?”

“Get lost, Mack,” spouted Rachel.

“With pleasure.”

The truck roared off through the desert. Half an hour later Omar could still hear its diesel engine pumping in the distance.

“Have a seat, pal.”

Omar sat down between her and Nick, whose gaze was fixed on the fire. Marco and Lola sat opposite them. Marco was throwing what looked like little seeds into the blaze.

“You folks know that fruit you’re saving won’t last more than a couple of weeks, right?”

“They give us more stuff than we need. Most people just lie around, not seeing any reason to be here anymore. That just leaves more for the rest of us.”

Omar watched as Marco robotically tossed another handful of seeds into the fire. Sometimes he would stick a few in his mouth and nibble them for a bit before spitting them out like bullets burning his tongue. He happened to glance up and meet Omar's gaze.

"And what's that look for, hombre? You gonna make another comment about me not understanding beauty?"

Omar squinted at him.

"Where did you get those seeds?" he asked slowly, teeth grinding.

Marco looked down at the palm of his hand. "What's it to ya?"

Omar took in a deep breath and exhaled, not once taking his eyes away from Marco's.

"Where," he repeated, even slower. The word seemed like an immense struggle to produce. "Where did you get them?"

The corner of Marco's lips curled slightly into a mischievous smile.

"The uneaten fruit, my friend. I like chewing 'em. Calms my nerves. And believe you me, my nerves are on fire every time I look at your miserable face."

Instantly Omar shot up, leapt around the side of the fire, and jammed his face right in front of Marco's.

"Where the hell do you get off?" Omar spat, the tip of his nose just a hair's breadth away from Marco's.

Marco smiled. "Boy, I just love getting' a rouse outta folks like you. Whatcha gonna do, huh? Whatever it is, go ahead. Do it. There ain't nothing holding you back, fella."

"Why don't you people wake up?" Omar's voice was getting louder. Several people, still as stones before, had turned or stood up to catch a glimpse of the only bit of action they were bound to see anytime soon.

"And do what exactly?" spouted Marco. "What is it that we done that's got you so riled up now?"

Omar was breathing heavily. He glared deep into the dark, desolate eyes of a man long gone, a man that had decided long ago that he had no chance of ever coming back down to Earth, and was spending the remainder of his life hiding behind a front.

Marco looked Omar up and down, and finally let a seed he had kept under his tongue fall to the ground, landing with a bounce on Omar's shoe.

"Shoot," he said. "That was my last one." He turned his back and started heading toward the food shack. With one swift and steady motion, Omar took four long strides and caught up with him, grabbed his shoulder, spun him around, and like a steam engine at top speed, rammed his clenched fist right into his jaw. The broken man shuddered and fell, a beaten soldier shot down, and collided with the dirt in a flurry of dust and spit.

Immediately Rachel and Nick were on their feet. Rachel jumped between the two men, as Nick grabbed Omar's arms and tried to contain him. Omar swung around and in a spinning swoop sent Nick reeling back without laying down a hand.

He put his hands up.

"I'm done!" he shouted.

Nick froze. Omar turned and faced Rachel.

"I'm done," he said, breathlessly.

Rachel looked down at Marco, who squirmed like an earthworm trying to stand back up. All he could muster was a feeble stare at Omar before he rolled over on his back. Omar walked right past him off into the desert and sat down on the lone rock he had seen earlier, panting and gazing in the direction of its trail.

"Nick," said Rachel. "Get him some water. Make sure he ain't dyin'."

She started toward Omar, stopping when she felt something grab at her ankle.

"Rachel..." Marco exhaled and coughed. "Don't let him back, Rachel. Don't let him live here. He wants t'be alone. Let 'im die out there. Give him what he wants."

She kept looking at Omar, now a stark silhouette frozen in time against a swirling backdrop of barren color.

“I don’t think you know what it is he wants, Marco.”

She left him there, flailing a bit on the ground to stop the world from spinning.



“That was quite the blow.”

Omar stared at the dirt. In his hand lay four seeds, each of a different fruit. He poked at them absentmindedly in his palm with his other hand. His breath came long and controlled, with a slight whistle from the hair in his nostrils.

“You didn’t have to do that, you know.”

He looked up toward the horizon. The stars were in full bloom now, like little holes punctured in a great snow globe. In his fifty-seven years of life, the stars hadn’t changed a bit. They still held the ingredients of life and, if you looked at them long enough, you would begin to feel them beaming their recipe your way.

She was a woman about half his age, and underneath the rough but fiercely gorgeous exterior she cherished those same ingredients. She took care of them like she would her own child, and thanked those stars whenever she could for giving them to her.

He looked down at her now. Her head rested in his lap; his back was propped up against the rock.

“Are you sure you want to go through with this?”

She looked up at him and smiled.

“Of course I am. I’d do anything for you, Pops.”

He brushed a stray hair out of her eye and smiled back at her.

The fires behind them were all out now. The small groups of prisoners had returned to their tents and the area was deathly still and quiet.

“Tell me what the world was like when you were younger. Before I was born.”

“It was greener,” he said, after a pause. “And quieter. I remember sneaking out at night and running out to the park behind our house in the summer, and I would watch the meteors bouncing off of the atmosphere. I used to think that they were trying to bust their way in, to tell us something...”

Rachel, staring upward, was lost in space.

“That was before the drilling, of course. Before people thought we had no choice but to uproot the trees because they were in the way of our last supplies of oil. Before the army decided it needed more space to prepare for war. Before the planet was so overpopulated that we had to start shipping criminals out to the desert.”

She took a deep breath. The shimmering stars were reflected in her eyes.

“Before your mother insisted that her drinking water wasn’t poisoned.”

Now the shimmering stars collected themselves in a single tear that brewed on her dark black eyelashes.

“And you know I need this as much as you do,” she said.

“I do,” he replied. “You’re one of the strongest people I know. I know you’ll be able to keep these folks on track.”

He reached into the pockets of his pants and pulled out several bags of seeds and soil.

“Better get to digging,” he said.

And so they did. They dug all night long until they had planted the seeds and covered them. They snuck some of the kegs of water out to this patch of land and poured it down.

“Mack will come back with more seeds and some fertilizer tomorrow,” said Omar. “I’ll have him hide it in with the fruit. Then I’ll be heading back with him to those damned bubbles we live in now.”

He put his hand on her shoulder.

“I don’t need to remind you why we’re doing this.”

“Nope.”

“And you already know that a place like this, where no one will interfere, is the best place to start.”

“Yup.”

“If you could convince this miserable bunch of people that they can still believe in something bigger, this could actually work.”

“Of course.”

Omar let out a deep sigh. It was the kind of sigh where all manner of worries and ghosts had gathered at the back of his throat to stream out through his nose and into the open air. He studied the desolate ground below him. Finally he smiled.

“Have I ever told you what a great actress you are?”

She beamed at him and they hugged.

“Go get some rest. The sun’s almost up.”

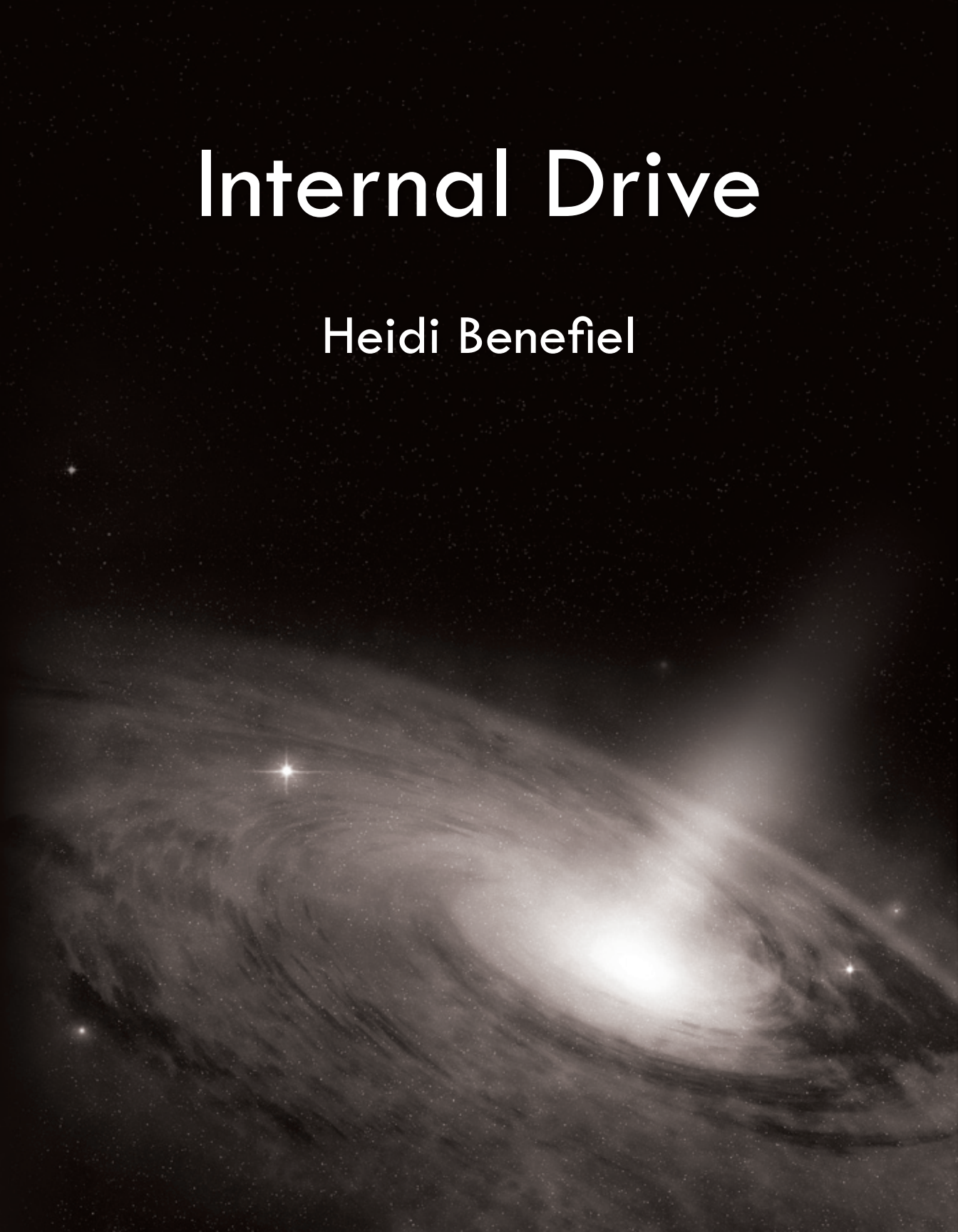
He kissed her on the forehead.

And with that, he lay down next to the freshly damp soil as Rachel went back into the tent and slept through the sunrise. He watched as it climbed up from below the horizon, cascading its ingredients down upon everything that welcomed them. He held his ear to the ground and could almost hear his seeds yawning and stretching. A wilderness full of color and energy was ready to come alive and breathe with him.

And when he listened closely, the rest of the Earth breathed with him too.

Internal Drive

Heidi Benefiel





They said we could only take five. How was I supposed to choose five? I needed medicine, food, shelter. I wanted beauty. I wanted freshness: lush, green newness in the surrounding habitat. 2072 looked to be a difficult year for me.

I chose grass to begin with. Grass is essential, not only for aesthetics but also for recreational purposes. Children could play sports and families could have picnics. Then there were the trees. Or rather, the tree. I could only really pick one. I knew it needed to be a fruit tree. Apple seemed like the obvious choice, but then I began to ponder citrus. An apple a day may keep the doctor away, but citrus has vitamin C. Oranges. An orange tree would be best. Plus the oranges would add such a striking color to the extremely green surroundings. Next came flowers; again, I needed something with good medicinal properties. It took some time and research, but I finally decided on Chrysanthemums.

Chrysanthemum flowers can be infused as a tea to treat headaches and fevers. In Asia, it's believed that chrysanthemum is useful for both cleansing the blood and curing insomnia. Compresses made from the blossoms can relieve common eye problems. As if all of those specifics weren't enough, the flowers are also believed to have antibiotic properties and to relieve cardiac conditions. With such a broad spectrum of medicinal uses, chrysanthemums seemed like the obvious and only choice. Perhaps in this new haven, chrysanthemum tea would be the new Starbucks. I imagined an entire chain of teahouses just for this purpose. They would make chrysanthemum cookies and cakes and scones. Bouquets of chrysanthemums would adorn each table, and people would surround these tables to talk about their new lives; the new problems this brought up, the new loves and hates and passions. Yes, chrysanthemums would be the plant of the future.

I became so caught up on the flower that I almost ran out of time to choose my other two plants. I wanted an herb or two. Lavender and basil fought with one another for quite some time, but basil won out because I chose to be selfish with that decision. All that was left was a vegetable. No need to hesitate there; corn could do so much! It is delicious and nutritious. Plus you could make almost anything with it, as most of the food at the time had some type of corn or corn syrup base. Corn is full of fiber as well as antioxidants. And so I had it, my essential five. *The essential five.*

These five plants would carry the human race into the unknown and foster them to continue on. What saddened me as I looked at the seeds I had placed before the committee was that nobody else seemed to mourn the plant life we would be losing. The seduction of roses, the devotion of ivy, the hopeful smile of sunflowers. What about the smells of all of these plants? Lavender, peppermint, and thyme's calming scent. Cloves, ginger, and cinnamon's alluring aroma. The deep embrace of pine and willow trees. I thought about all of this and so much more as I walked out of the boardroom back into the world that had precious little remaining time.

Ignorance is what kept these scientists and society from realizing what they would be losing. The artificial copy of Earth's natural magnificence was only more attractive because it meant more technology. Humanity didn't care if they could smell or see or feel this vegetation anymore. No—they had pictures, candles, and video that would obviously replace such insignificant foliage. They wouldn't even have to deal with the mess of allergies or pollen anymore! Hooray!

It made me sick. I thought to myself, what will the poets do? Nature has long been a central theme of poetry. Would they now turn to iApple, or whatever the fuck it was called, for inspiration? Would my potential children master the English language by concocting rhymes with words like "microchip" and "floppy disk"? I didn't want that. Every part of me rebelled against ever leaving this place of my birth, not only for selfish reasons but also for the future of my race.

The farther I walked away from the boardroom, the more I regretted the time I had spent researching the essential five. I should have spent that time in some national park,

bathing in a river and eating nothing but berries. Alas, that time was gone. I began to worry that if our poetry changed, so would our souls, our romance, our sex. Had poetry not influenced and attempted to capture such fleeting moments of our fragile lives? It only made sense that these elements would also be affected.

This new floating City wouldn't have fresh coffee or tea; everything but the essential five would be artificial. No bees would pollenate, no birds would sing from the branches of the orange trees. All animal life would be holographic. I admit that at first I thought it would be wonderful. When I was approached about being involved with the project I was honored, albeit surprised. I dove into my research with passion and purpose. They say that hindsight is 20/20, and "they"—whoever they are—are definitely right.

If our food became mostly artificial I wondered what the impact on our bodies might be. There had already been so much controversy and conspiracy surrounding GMOs and processed foods, but I never paid attention until I had sealed the fate of so many foods. Those last months I watched endless documentaries on the issue, read countless articles, and uploaded each significant piece to my internal hard drive. I studied up on the extinction of rainforests and how that had affected our atmosphere. My brain cross-referenced this with how the petri dish hamburger had cut the number of cows worldwide in half. Some argued that the loss of pure meat meant the loss of so many haunting flu viruses, but I begged to differ. Even before my research, I knew that the rare flu could kill even the healthiest of healthy.

That's another thing—illness. Overall, the world had become consistently less sick, but the sicknesses that did linger were incurable, like some advanced and futuristic plague. I couldn't know how illness would manifest on this floating City. It might not exist there at all, in the beginning. But without nutrients from freshly harvested food, I was afraid sickness could spread more quickly and kill within hours.

It was true that our planet was dying. It only had a few hundred years or so left in it, if we were lucky. But people wanted out immediately. They didn't want to take risks with something as volatile as nature. They thought a well-regulated, artificial fishbowl was the best option. Apparently technology isn't volatile. While I laughed inside my head at

everyone's pure faith in this project, I also reflected on the fact that it had been a long time since our world had been so fully united on something. It was almost religious, and for that fact alone, I had to respect the decision we were all making.

It was scary—leaving the place I'd always known, venturing out into the deep, dark void of space. Exhilarating, yes, but also frightening. Experimental projects had been conducted to ensure that this endeavor would not be catastrophic, and the results were superb—or so the media told us. As a scientist, I knew I shouldn't be questioning the odyssey. After all, what would my colleagues think? Then again, it was my job to look analytically at the world. I wanted to be more vocal with my concerns and thoughts, but I knew it wouldn't change anything.

The night after the essential five had been announced to the public and locked into place on the massive City, I drank myself to sleep. It wasn't something I'd ever done before, but wine would soon become a precious commodity, so I figured it was worth a little moral deviation. In my drunken state, I recorded all of my thoughts and fears. At the time I felt like a philosopher-slash-genius. The next morning I felt like a teenage girl.

The best solution I could come up with for my unprecedented existential crisis was to remind myself why I had become a scientist and enjoy the remaining two months I had on Earth. I reread all of my favorite articles and research books. I went through and finally organized all of my personal research and experiments. I dusted off the awards and certificates that hung in my tomb of an office and reflected on the moments when I had received each one. It was a rewarding day that centered me as a scientist and as a person. I had never been like other scientists, and that made me happy. I still had a heart and some semblance of emotion. I was not yet a robot, even if I had an internal solid state (SS for short) drive. Everyone else had one too, so that technically didn't make me *less* human.

I took long walks through city gardens and parks. I breathed in deeply the perfume of the plants I had doomed to annihilation. I wondered if they could feel the evil walking among them, the traitor I was to their kind. I was grateful we had not yet mixed

technology and plants. They were already too much alive for my liking; if they could register emotion, I would have been suicidal.

Foolish is the word I would use to describe how I spent my remaining time on Earth, as all I did was sit in parks and stare. Every sense took in what it could of the plants and animals around me. Squirrels and bees and butterflies all became fascinating. I should have spent that time finishing up any research or experiments that were Earth-specific. I should have written up the last of my Earth-based theories and observations, then submitted them to some important library or committee. I should have eaten the last of the true cheesecakes and sushi and salads. I should have luxuriated in natural hot springs and rivers and the ocean. Just once, I wish I had gone swimming in the ocean without a care in the world. But I did not. I sat, stale, an embarrassment to science and unable to ever associate again with my kind.

My kind were never sentimental or sensuous. No, they were cautious and calculating and serene. They did not have regrets—only erroneous theories that led them to new and better hypotheses. Everyone in my scientific circle merely thought I was locked away doing all of the things I should have been doing, so I suppose I didn't have to self-exile. However, my heart and mind just weren't in it anymore. I couldn't allow myself to be cooped up on some floating island debating concepts with a bunch of talking walls. Those days were behind me. I wanted my life to change, even if the change was slight.

Time slipped away like money on Black Friday. The new update for our internal SS drives was ready to be installed. It was compatible with aspects of the new City, an interactive device right up our sleeves...literally. Like a good citizen, I received mine. If anything, it would make life there easier to figure out. Technology and science seemed to always go hand in hand for me, even if I rebelled against that thought. I was merely keeping up with the times, but deep down I knew that these updates would become necessary. Not only for people like myself, but for everyone. The new era of humanity would require internal drives. It was how society was progressing and therefore logical for me to assume.

The day arrived with fair warning and ceremony, but I still felt surprise when the ships landed. These pods were going to spend the next three days transporting the world's occupants from Earth to the City. Only a select few were to remain on Earth for a couple of extra months, for scientific and political reasons. Most of the people staying on were construction workers who would demolish the Earth's cities as best as they could. Some small shred of humanity led a fellow scientist to suggest it was unfair to leave behind an almost-completely urbanized world for the animals. Habitats were not exactly being built or recovered, but at least we were making an effort. No animals went to the City. It simply was not built for those purposes. Or so they said.

I knew I should have wanted to hold my head high and proud for the praise that would be rained upon me for my role in the project. Surely this is what many scientists dream of, and here I had achieved it. I asked myself endlessly what was wrong with me, but every time all I could think of was the park on a rainy day. It would be empty and musical and dreamlike in its green wetness. The smell of rain on concrete would incense the surroundings and bless the rare wanderer who ventured out in such weather. What was wrong with me that all I could think about was weather and plants?

I should've seen a psychologist before I boarded that pod reserved only for the secondary scientists who helped birth the City. Maybe it would have prevented me from fighting back tears as I took one final look out of the double-paned window at the planet that was no longer my own. Maybe it would have prevented me from drinking only chrysanthemum tea and refusing to eat. Maybe it would have helped for me to talk to a doctor instead of the hallucinations that emanated from my nutrient-deprived body. Maybe, maybe, maybe....

I didn't go see a psychologist. So the fact of the matter is that within two weeks on the City I collapsed in my apartment, after crying hysterically for what felt like two days straight. My D.N.E.B. (Daily Nutrient Examination Bot) alerted a medical team when I wouldn't wake up to be examined. For what it's worth, without the City's technologies I would have been dead. The medical team took me to the hospital where I was diagnosed with PTSD, malnutrition, and myriad other medical terms. I felt oddly distant from

everything that was happening to me. I wanted to make these doctors understand that there wasn't anything wrong with me; it was humanity. Humanity and its progress and science had driven me to this point, not some internal hormonal malfunction.

Now I watch on television screens in padded rooms as the City digs itself into a deeper hole of technological dependence. A hole without nature. A hole ignorant of what it has sacrificed. There is talk of sending scientists back to Earth to be a new kind of pilgrim, exploring the known-unknown of a planet without humans. I can't tell if they are doing this just to please society, or if they really think something can be gained from seeing what has happened in the three years since we left. What they plan to do there or bring back, I don't know. Maybe humanity will learn something, maybe they won't. Who's to say?

Someday I hope that these people will see the error of their ways. That they'll see how much we needed nature. That technology is not the answer to everything. I highly doubt it, though, seeing as how books aren't even in print anymore. Text is read off of our SS drives straight into our brains. A person can "experience" a novel in under an hour. The concept is neat, but I believe that it should be an option, not the only form of "reading." Paper in general is no longer in use. Everything is stored in the cloud and written digitally. A person can keep a personal journal just by thinking. All you have to do is activate "Journal Entry" on your SS drive and there you have it, every thought immortalized in a digital sky.

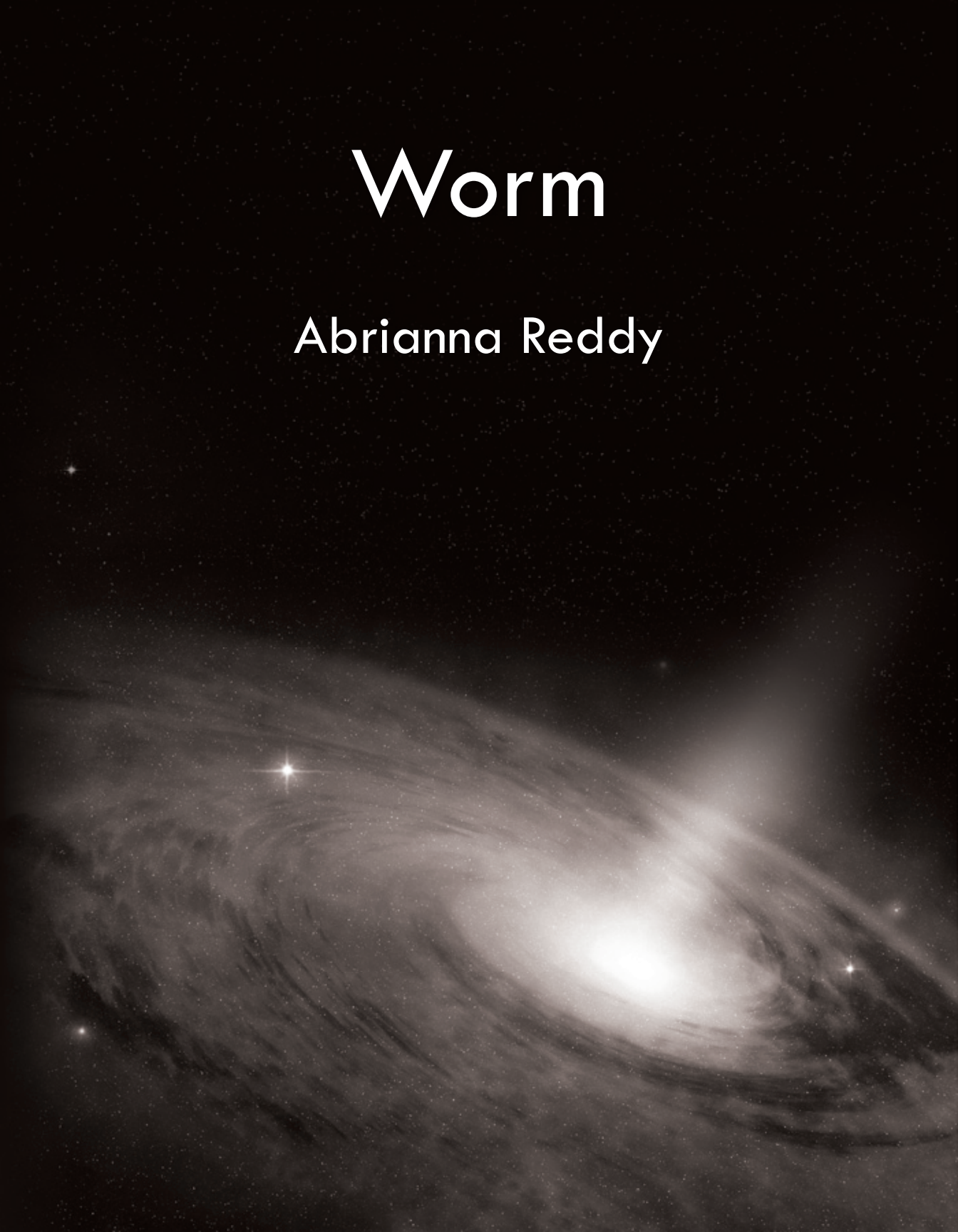
Part of me wishes I wasn't so old-fashioned and skeptical. Part of me misses the old me. But it just can't be like that anymore. I am who I am now. I don't enjoy the technological advances or the "Brain Streams" or the never-ending, twenty-four seven media feed. It's a wonder no one else has expressed these same feelings. One might think humanity has been brainwashed—if one were able to conceive of such an idea. New ideas are no longer given life. This new form of media has made it difficult for writers and filmmakers; most of the movies and books are just revamped versions of their former selves, dressed in shiny new technology. Reality is sad.

Heidi Benefiel

I try not to laugh when the television praises me as someone possessed of so much genius it caused me to lose my mind. I haven't lost my mind; rather, I have gained my humanity. I have lost my scientific-ness perhaps, but I found a piece of me that cared about literature and nature and the future of my race, existentially not technologically. Choosing the essential five was not my undoing. The scrubbed air of the City that sanitized and burned my lungs, the trees and plants left to wither away on Earth, technology with all of its endless advances, poetry and science—these were the essential five that tore me apart. My personal group of data that has seeded its way into my soul and eaten away at my internal drive.

Worm

Abrianna Reddy





In the year zero, the human race was at its zenith. It had already expanded beyond what was thought possible a millennium earlier, laying claim to entire star systems and establishing new civilisations. Year zero was the one that changed it all. That was the year they were finally able to go beyond the hypothetical: they created what they had only imagined for so long. But it was too soon for humanity.

It's been one hundred years since then. Time is still relative to the Centre's orbit, out of tradition, although only a small percentage of the human population lives there now. All the civilisations on different planets needed to measure time the same way, to ease communication and to keep them in sync. As for the numbering of the years, it was decided that this was such a significant advancement in human history that our measurement of time itself should revolve around it. Time thereafter would revolve around the event that made time insignificant, the event that enabled the human race to control time, to bend it to their will.

There were limitations created, of course. Travelling through time is a dangerous thing, and there were several rules against interfering with the timeline. The wormhole mouths are always monitored, all of them, everywhere, and everywhen, too. Every year from year zero onward, they're watching the wormhole mouths. They monitor them, they have monitored them, and they always will. They're watching them in the future as well, of course.

There were other limitations, besides the ones that would cause paradoxes. For one, no person could go back before year zero, because none of the wormholes existed before then. Forever anyone could go back as far as year zero, but never before then. That was

never a problem with the humans. They had no desire to travel back to the time before their landmark achievement.

The wormholes were connections in the fabric of spacetime that didn't need to be there. They were artificial—merely edges of time pulled together by human technology. One end of the wormhole was accelerated, while the other remained stationary. The accelerated end would be pulled through physical space by high-speed machines, allowing time to pass more slowly on that end. The machines would make stops after they had accelerated enough, allowing people to enter the wormholes, coming out years earlier on the other side.

The idea had stuck with scientists for a long time, but they could never come up with a way to generate the energy to create the wormholes. Until year zero, that is.

People generally didn't question it. They knew that it involved harnessing the energy of a supernova, which was fine, of course, since as they'd been taught, there were no other forms of life out there, or at least none with intelligence worth comparing to theirs. Besides, the energy of a supernova could only be used at the end of a star's life cycle, when it was bound to burn up anyway.

This is where I come into the story. Well, not quite yet. The story that comes before mine is that of a girl living in the year one hundred. She was curious, of course, and that was how she came to discover the truth.

In honour of the centennial anniversary, many new wormholes throughout the galaxy were created. On her home planet, Kepler-62e, a new wormhole had arrived: one which led back to year zero. She entered the wormhole before it was officially open to the public, however. This is how my story began.

I had never been through a wormhole, so I could only imagine what it was like to hurtle through time and space. I knew it wouldn't last long enough for it to be noticeable—the time spent inside the wormhole, I mean. I feared them, though, despite all the work we'd put into them and all the knowledge we shared about them. It wasn't the kind

of thing you'd openly admit to in my line of work, though. I kept quiet, and if anyone shared the feeling there was no way of knowing.

The thing I should have been worrying about was the centennial, because there would be visitors soon. It was strange, thinking of time this way. We'd only sent out the other end of this wormhole a few months ago, and now people from one hundred years in our future were going to come through it. They would arrive in a few hours, when the clocks struck twelve.

There were precautions to be taken, just in case the wormhole system failed. This was highly unlikely, they all reassured us, but still we had to keep away from the people who entered. We could talk to them, but they weren't allowed to talk to us. We couldn't let them give away our futures, because then they'd be set in stone. Knowing the future is a dangerous thing; we all knew that well enough.

I was so busy worrying about the visitors from tomorrow that I didn't notice one had arrived early. It wasn't until later that I found her roaming around the facilities.

It took me a while to make the connection. My first thought upon seeing her was to wonder how she got into the building; getting past security wasn't something a lost, wandering child could do.

"Is she with you?" the security guards asked when they noticed me staring at the unfamiliar girl. It wasn't uncommon for us to bring visitors.

I don't know what compelled me to say yes, but I think it was something in her eyes, something akin to mine. I somehow knew it was the fear. It had to be. Don't get me wrong, she didn't look afraid—no, she looked defiant, angry even. Her eyes weren't pleading for help. She wasn't scared of this place. She was scared of the wormholes.

There was something about the wormholes—the ambiguity, I suppose—that led some people to fear them. Sure, you learned all about them in school, and I, for one, knew far more than the average person, but no one, or at least no one of this time, knew what it was like to go through one. Everyone knew that it would be painless, that it wouldn't

last even for a second, and yet some feared it. Perhaps we were wary because it seemed too good to be true.

“Yes,” I replied to the guards without thinking. *Quick, keep going. Don’t let them get suspicious.* “She’s my...sister.” That was believable enough. She was too old to be my daughter or anything else, so sister would have to do. The guards didn’t respond, just moved along. They had more important business to attend to, after all: guarding our end of the wormhole.

I could ask her questions now. Normal questions that you’d ask to a stranger who popped up out of nowhere. Who are you? How’d you get in? But instead, I was compelled to ask something else. “What was it like?”

She was just as surprised as I was upon hearing these words, and I realised she probably didn’t have any idea what I was talking about. I began to explain again, but she cut me off.

“Inside the wormhole, you mean?”

I nodded.

“How’d you know?”

I answered her question with another question. “Was it terrifying?” I don’t think I would have been able to give a straight answer to her question anyway, since I wasn’t sure how I knew.

“I don’t remember,” she said. “It was fast, like it never even happened.”

At this point I realised I had forgotten that something was not quite right.

“You’re early,” I told her. It wasn’t a direct question, more of a challenge for her. “The others won’t be arriving for another hour or so.”

“I know. I snuck in.”

I didn’t even bother to ask how. It seemed that now was when my brain finally started working.

"I'm sending you back."

"What? Now?"

"I have to do it before everyone else gets here in an hour. I'd send you back with them, but they'd notice an extra passenger, wouldn't they?"

"Who says I can't stay here?"

She can't. She knows she can't. People will eventually realize that there's someone living here who shouldn't be. Worse, it's someone from the future, not the past. It's someone who can ruin the future for people, force them into changing the timeline by trying to avoid less fortunate endings to their stories. She's not welcome here, and she knows it. I'll be in trouble too, just for talking to her. We're not supposed to interact with them.

"I have to know something first."

"What?"

"The wormholes, there's nothing about them in the textbooks. Tell me how they work."

"What? They're supposed to explain it to you."

"Well, they don't. That's how it is in the future: they deprive you of knowledge. And nobody notices. Nobody even cares."

"Why would they keep it from you? Why would they want to hide what—"

Oh.

Now you've done it, I think. Stop talking to her and get her out of here. Now you know something about the future. And you're going to try to stop it from happening, even though you know you're not supposed to.

She's waiting for an answer. I can't tell her, she would tell other people. Even if she didn't, it would be carrying secret knowledge. I couldn't do that. I wasn't allowed to. I was—

My thoughts were cut off by the sound of an alarm.

"They know I'm here," she said.

"This way," I said, without thinking. We ran down a corridor, back to where the mouth of the wormhole was. "Why am I even helping you?" I asked her.

It was a rhetorical question, but she grinned like she had an answer. "You know me," she said. "Not yet, but you will. You died, though. Twelve years ago. I hardly knew you; I was only five. You lived a long life, though. Everyone said you deserved it."

No—more information about the future. Not just that, but *my* future. I couldn't let her do that. But I did feel like I knew her. And I wanted to know more. But it was against the law. I couldn't. And yet....

"The Council," I said to her. "They're proposing something. Just a consideration. It might be implemented. But if we want them to go commercial then there's not a better alternative they can think of. Do you know how much energy it takes to create a wormhole?"

"A lot?" she guessed.

"About as much energy as from a star at the end of its life cycle. That's where we get it now. But they think it won't be enough."

"So what? They're going to kill off star systems? But even if they do that, how is that a problem? No one's living in them."

"Wrong."

"What?"

"You're not alone. There are other life forms out there. And they're being killed off."

"Not intelligent ones, though?"

I shake my head.

"Why wouldn't they tell us this?" She looks stricken.

"Would you want to close off all the wormholes?"

“So what do you want me to do?”

I didn't know there was a point to telling her all this. This was wrong, changing the future, giving out forbidden information.

“Tell people. Tell everyone you can.”

“When you died,” she said, “you said you were happy. Because you had met someone, a long time ago, and you told them something. Something important. And something secret. A secret that had to be known.

“Get out of here,” she said. “You can't let them know you helped me.”

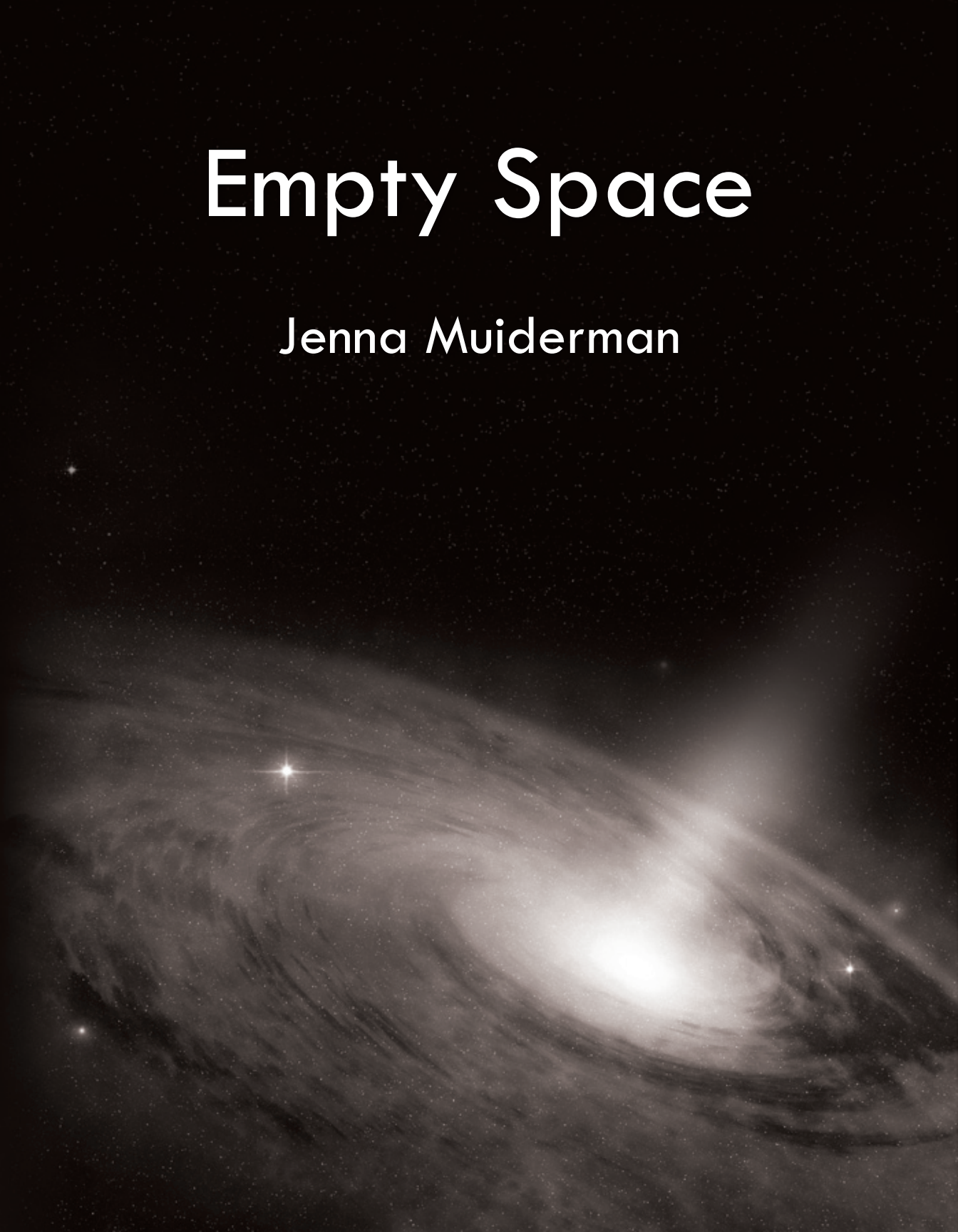
Right. Right. Get out. My brain couldn't really process information anymore.

She gave her last farewell before passing through the wormhole.

“See you in eighty-eight years.”

Empty Space

Jenna Muiderman





T*ransmission sent 2902 4/31 05:00*

A little boy clutches my arm. He senses what I know, what I want you to know, if any of you are still alive: that I am dying. I might last another day, but that's all. As if a day has any meaning in this place. I've disabled the backup system. In thousands of years' time, when this ship finally reaches its destination, it will be without an explorer.

I can see trees, ancient and huge. I can feel the closeness of the thick air, green and foggy and cool around me. I can feel the rough bark against my back, and I can hear the stream that runs by my feet. But it's a lie. A pleasant lie, but a lie nonetheless. The desperate, yet halting touch of my son's little hands is the only thing I know to be real.

I regret only one thing: that he will grow up with nothing resembling another life except the Artificial Intelligence to keep him company. It's a fate no different from dozens of generations of his grandmothers, but I won't allow it to be wrought on hundreds of more generations of my granddaughters.

The trees fade and I catch glimpses of the ship's smooth white walls, even through the holograms you so kindly provided. There are barely twenty cubic meters in this box, just enough not to seem abjectly cruel.

You were such idealists, weren't you? You set out to reach another world. It was a dream that permeated your entire globe, one that inspired your scientists and artists. It was a dream that had driven you for thousands of years. And you couldn't wait a few hundred more? You couldn't wait until you could send a whole city-ship? You hadn't even developed stasis yet, and the female body was still the most efficient means of incubating the next generation.

When that first woman stepped aboard this ship, she was giddy with the knowledge that she had been chosen over a million other volunteers. She was proud and delighted that she most effectively represented the people of the world, and that the whole world was willing her to succeed. But did she really know the magnitude of what she chose? Did she know that she doomed all her descendants to the most acute loneliness imaginable?

I speak every language that still survived when this ship was launched, and I have no one to talk with but a computer. I've studied every area of science I could find, but all I have is this little box and the nearly empty space that surrounds it. I could have told you how to create stasis, and I don't have any more knowledge of technology than you possessed fifty years after this ship left. I just had a lifetime to pursue as many futile tasks as I desired.

I could have told you how to preserve my hundred-times-great grandmother for the whole of this journey, so that she could be your explorer, and nobody would have to live here without consent. I could even create a device, but there is no material here except the ship and its fuel, and what is needed to keep me alive. You told yourselves that it was a good thing; that there would be people to record the journey, to study the universe around them. It wouldn't be a loss, you said; they'll be able to experience anything they want, because the whole ship, at the push of a button, is a virtual reality chamber.

But just because you, with your real world just outside the door, couldn't tell the difference, you thought that the descendants of some of your most brilliant wouldn't see the façade? It doesn't matter how real it looks or feels or smells, as long as we know it's a lie.

The lie I chose was this forest. There was comfort in the trees, in their closeness, but without a sense of restriction. I wish I could have chosen an open field, a mountaintop, something vast and grand, but there is only so far I can go away from the one small space I have known. I don't feel safe without something closing me in. Most of the occupants of this ship lived within its tiny confines, and knew what reality was even when the projectors filled all their senses. So far I've chosen to bring up this small creature, my son, with something else. Something besides the quiet empty darkness.

Something more beautiful than glossy white paint. Something besides the dramatic irony of living in a tiny box with infinity all around.

You were so insistent that this exploration represented freedom, but that is a second lie. Though you were idealists, you still considered the possibility of sabotage, of failure. Although you presented it as a great honor for those onboard, you never trusted us. You made it impossible for a passenger to die before she had given birth to a child, and even then you had an emergency backup. You set up an algorithm for desirable traits, gave us no say in the tiny vial that would father our children. This ship is a prison, a prison that you knew very well you would never see again. It didn't really matter what happened to it, not to most of you, as long as you knew you had the *freedom* to leave your little planet. The people monitoring the ship's progress stopped updating the public long ago, and no one seemed to care. It wasn't freedom you were worried about, was it? It was nothing more than power.

Did you ever develop space travel on a larger scale, or were you happy knowing you could? You could have thousands of ships following this one, or your cities could be reduced to dust. The last time I checked, your planet was barely hanging on. But I'm decades behind, as the radio waves that you still deign to send fade through the emptiness.

I stand up unsteadily and walk to the bed. My son follows me, still holding my hand. He's afraid. He doesn't want to show it, but I can tell. I hope I've been a good mother for the few years he's lived. Originally he was just my way to spare anyone else from this fate, but I love him absolutely.

The one thing you thought through thoroughly was the continuation of your explorers of box and of empty perpetual nighttime sky. I tried not to doom one more child to this fate, but I couldn't even have that mercy. The best I could manage was to prematurely engage the protocol that would have been activated when this ship landed, allowing males to be born. I almost laugh that with all your precautions you never expected this, so the backup didn't kick in when the system realized the child wasn't female. I had tried to disable it before, but it's on high alert before the current occupant has furnished

the future. It took me five more years to disable it completely. If I hadn't, it would have created a baby girl when Endeavor dies.

I named him after the ship, do you like that? It's the one thing in our children's lives that you gave us control over. Do you think it's cruel to give such a name to a doomed little boy? Can you appreciate the irony in your name now?

Transmission sent 2902 5/1 03:00

The WW Endeavor I. *World Wide Endeavor One*. Did any of those monikers seem pretentious to you? You printed it on the side in bold, in as many languages as you could fit, so that the tiny ship is a garish collage of letters. You even put it in the colors of the flags of countries the languages were spoken in. You let schoolchildren paint it; some of them wrote messages in the space for their country. *Good luck. We are all watching. Have an amazing journey.* The first woman drank it all in, I'm sure. Now the words sit there mocking me, even though I can't see any of them. No one will ever see any of them again, not unless you *have* developed space travel and someday want to see what has become of your first experiment. I've long ceased to believe that you will ever meet other civilizations. They may exist, but space is too vast. I'm travelling thousands of miles a minute, a speed that most of you couldn't even comprehend, and all my life nothing has moved.

Do you think I'm pretentious, arrogant, ungrateful? Do you think it's not my place to sabotage your precious mission? Why should I be the one to decide its future? I'm not the first to despise this fate. None of this ship's occupants may have known one another for more than a few years, and even then one had only a child's memory of her mother. We have nothing more to do, and nothing to leave our children except for a detailed account of our short, pointless lives. For if ever lives were pointless, they are the ones that begin and end in this box that is smaller on the inside.

I haven't decided whether to tell him. It's terribly late to leave such a thing, I admit. I can tell it won't be long now. I've tried to decide before, and I can never settle. There are two buttons beneath my finger: one continues the virtual reality that he and I have been living in for most of his conscious life, and the other tells him the truth, takes

away forever any pleasure in the dream. I don't know which is kinder. You may think it's a simple conundrum, but you can't imagine how profoundly one can hang onto knowledge one finds horrifying. Still, the idea of not knowing is more terrible than the reality. Do I give him that freedom?

I don't know how long he will live. Your technology for keeping your prisoners alive is admirable, but there is also nothing to waste. If he lives into his old age, your machines have no equipment for anyone but healthy young people. At some point the system will drain his life support to save the backup it no longer has, just as it's doing with me now to save him.

It isn't a painful death—in that at least you were careful—but it's a very self-aware one. I can't pretend I'm falling asleep, not for the months of slow, albeit painless deterioration.

You thought your sacrifices were worth the enormity of the task, and even as I destroy the mission's last chance, its real goal was achieved before it even left your atmosphere. Your planet may have been hanging by a thread the last time I checked, but even in the face of that you maintained your world peace. That's why I'm ending it now, if I'm being completely honest. This mission achieved its usefulness for humanity; your jurisdiction is over as far as anyone on board could be concerned. Signals from Earth are barely existent, anyway, and it's been a long time since any direct communication was attempted.

Despite everything you weren't evil—just naïve, just single-minded. If you ever happen to find this, I want you to know that however bitter I am, I understand you better than you did yourselves. That is the one hollow victory I can have, and it must be enough.

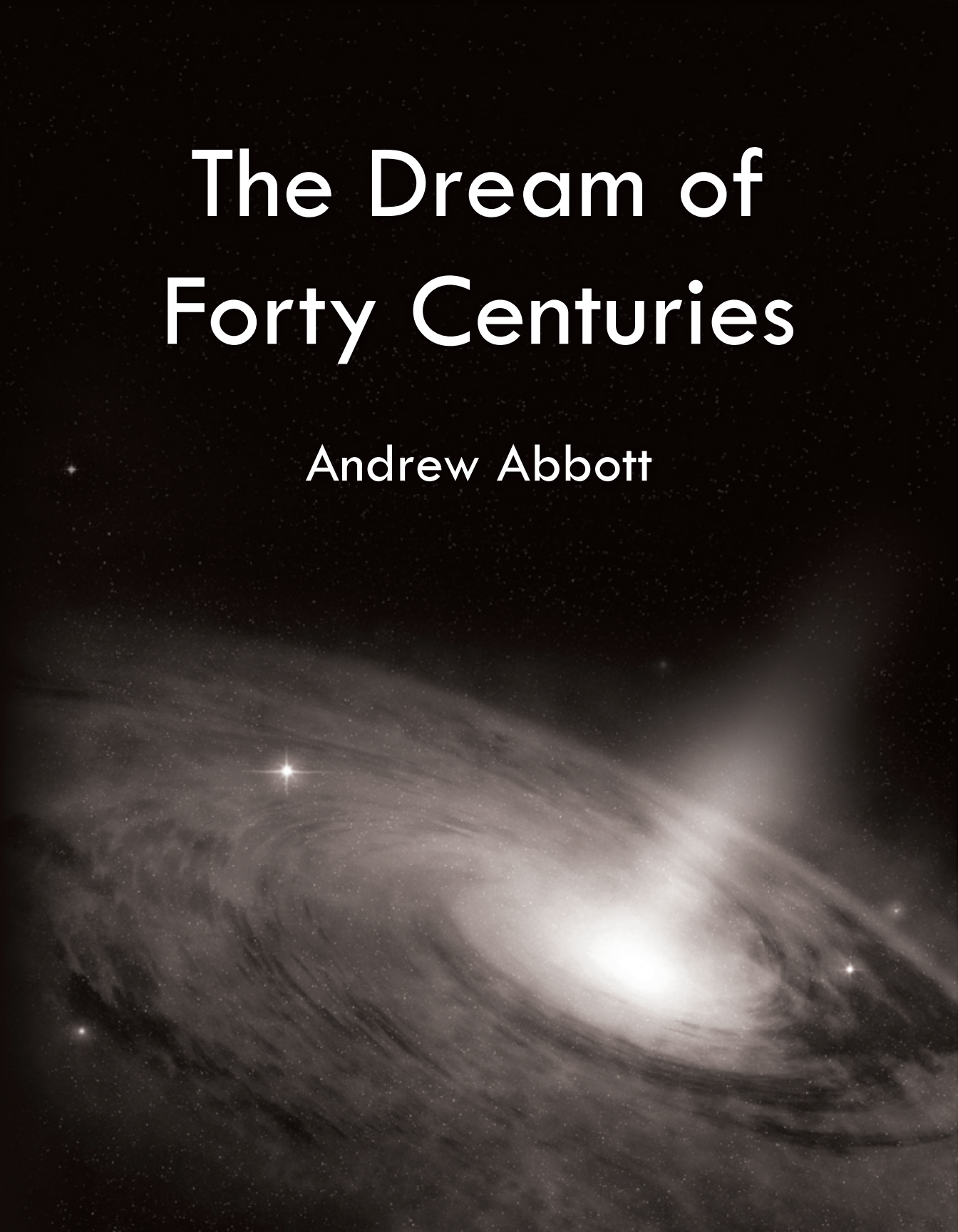
Endeavor clutches my arm. I smile at him, stroke his shiny blond curls. My heart beats faster until it finally begins to slow. I feel unexpectedly warm. My hand slips from the controls and they fall at his feet. I can make no move to retrieve them.

He looks up at me, then picks up the controls. I hear a faint click.

I can't see which he has pressed.

The Dream of Forty Centuries

Andrew Abbott





Help me! I want off this island! I hate it here. It's the ultimate weight loss program. I mean, really; I'm eating lizards, bugs, fish, and clams. There's the occasional sea bird, but not often. I have no idea how many calories I eat each day, but I'm worse than high school skinny—I'm like high school anorexic. The heat gives me an eighteen-hour-a-day sauna, and the other six hours I try to sleep. There is water, but not enough. There is shade, but not enough: two scrawny little palm trees here in the middle of Nowhere Island.

The water around the coral reef looks great. Beautiful, in fact. Good enough to be on a postcard. Postcards...there were postcards on the ship. Not an ocean ship, I mean; this was a space ship. Of course it was a whole lot bigger, but then—well, imaginary listener, why don't you sit down and listen? I don't have much to do, the lizards aren't out yet, and those two palm trees are looking scrawnier than ever.

It began about five years ago...while I'm talking, just ignore the bugs. Those yellow ones taste awful; the purple ones are all right, but really hard to catch. Anyway, about five years ago the second Hotel Earth was launched. Sixty-four miles above the Earth. In weightlessness. It was the best, brightest, most amazing thing anyone had ever seen. But Romulus Osi wanted more than that. Until then he had owned gas stations, shipyards, sports teams, and other boring stuff. But now he wanted to do something fun, like build another hotel that orbited the Moon.

Hang on just a minute—the one spring on the island is in. It only runs fresh for about fifteen minutes a day. I need to make sure it's running into my trench so I can store it. You have no idea how hard it was to rig this up. Just let me get a drink.

Okay, I'm back.

Nine months ago, I think (I'm losing track of time now), the Lunar Inn and Suites were revealed. It was the grandest thing anyone had ever seen. There were almost two hundred rooms, a pool, a sauna (I wish I had used it less then, and packed on more pounds for now), room service, televisions, and Wi-Fi, of course. Oxygen was created by a complex system of plants and false ecosystems, which acted as natural filters for the air. The water was recycled, and each rotation of staff brought more food and water with it. For those that wanted to pay more than the usual nine thousand Galactic Credits a day for their stay, they could take a hop to the Moon's surface for a song, or do a spacewalk for just three thousand GCs.

People who didn't want to take their meals in bed could dine in the plush restaurant. If you wanted a drink, they would drop the right tablet into a cup of water, and there it was, martini, juice, whatever. When you ordered your food, the waiter went into the kitchen, to a massive machine, and typed in what you wanted. With a whirl it dehydrated food, warmed food, spiced food—basically, it did whatever you wanted to food—until the plate came out of the slot within about a minute, always looking great.

I remember standing at the massive observation windows facing Earth. From there I could see the last of the twenty spacecraft, each with seven people and the pilot, having taken off from SpacePort America, landing in the docking bay. In a way, that was much how this hotel had been built, with pods arriving for a year and half to dock and stay as an already-complete bathroom, bedroom, or something else. Many of the people aboard were money magnates or politicians, launching from two sites, including SpacePorts America and Europe.

And me? I was just a friend of Osi, the Italian billionaire who had imagined the whole thing. I was here officially to write press releases, so I brought along a young reporter. He wrote stories, I read them, put my name down, and continued enjoying my extended vacation.

I turned away from the blackness of space to the dimness of the soft lights behind me. I remember I glanced at the clocks on the wall giving Earth times. One in the morning at home. I wondered if there were Moon time zones. If not, it was just because nobody had

thought of it yet. They would—somebody would work it all out, with Spacelight Savings Time and everything, I guessed.

The hotel was built in amazing time, and it came in under budget. That had driven the inspectors crazy, until they had been reminded that this was a favor to them to be allowed to visit. They'd stopped coming, simply because Osi had stopped providing transportation for them to his hotel. There was nothing they could do; he wasn't technically breaking any law. There was nothing that said you had to transport the inspectors to your facility, and Italy had no space program. Nobody else cared much about it, so they were left to whine and collect taxes. But no more inspections, not even when the full power engine was installed.

Man! I really enjoyed myself that first day. That evening I had dinner with Osi himself. He was wearing a bathrobe and a brown hat and smoking a two hundred dollar cigar. He told me he had been well-named:

"The first king of Rome was named Romulus. He built an empire. Well, I too have begun something big, but it will not be a few measly acres around one little lake called the Mediterranean. We will have commerce throughout the stars. Man has spent too much time looking at his feet. He needs to look and see how small he is. Once he sees that, once man feels small, then he can dream big."

"What if something gets in your way?" I asked my old friend.

"What? Like those inspectors that thought they would come up and see how our engines run? Bosh! Industry, man! Business! After all, we had to hurry up here before the competition."

"How do the engines work?"

"They're nuclear."

"On a space ship? Romulus, is that safe?"

He laughed and took another whiff of his cigar. He gestured at the glass floor of his suite, beneath which we could see the Moon's surface.

“The view is worth the headache. And besides, everything was done according to standards.”

Sorry, I need another drink. Ugh, warm! Okay.

The next afternoon—after getting out a story about the daughter of the prime minister of England and her spacewalk—Rigson, my reporter who wore glasses and knee-pants and knew calculus, was checking on stories back home.

It was the usual: A fire was burning in some national forest, the voice of Winnie the Pooh had died, and star one was marrying star two after breaking up with star three. All of this was topped off by an exciting and must-read story about how our government was full of gerbils—like that was news—and how we were all still headed for the Mayan Apocalypse. Apparently some idiot had gotten the first date wrong.

That’s when that other story came up. Rigson told me that a few people were sick aboard the ship. We didn’t know what it was yet, but they were in the sick bay. And should he get it out to the wires?

“No, not yet. Let’s wait a day or two to let that one go out. No early panic. They’re maybe just not acclimated yet.” He shrugged and went back to work. I leaned back and looked at the view of the Moon.

So that was the first step of the problem: some people got sick. The next day another person came down with something, but they weren’t too bad, so they went to sick bay with a headache. One more came down the day after that, so it hit the wires, “Altitude Gives Headaches.” Nobody really paid attention; they were too busy talking about how great it was and how fast space travel was coming on. And the spacecraft continued to ferry people back and forth.

There was a birthday party on board. Somebody was caught having an affair. Still playing all the way up here. Even the dangers of space didn’t faze some.

That night I lay my head back and looked down at the Atlantic Ocean, so far away. Here artificial days and nights were observed, with massive shades and lights providing the feeling of cycle. But down there, it worked so much better than our fake ones. Down

there, there were no scientific formulas, no constant monitoring of a million things just to be sure that there was gravity. Nobody had to check oxygen levels, nobody had to steer the thing.

But still, of course, this ship, this job, the ones who had made it happen, it was all for the fun of it. I mean, even with the scientists, almost nobody really cared about redshift and expanding universes and microorganisms and rocks on Mars, except for how much it put into the wallet. It's not about the work, it's about the people. That's why everything is footnoted. When I got back I would get medals for being a genius in my stories. I would be wined and dined. I liked that. Not reporting. There were some, but far too few, who really cared about what they did; for most, it was only about what they got.

The next morning, a waitress brought in my eggs and slipped an orange juice tablet into my water. I took a sip and put the glass down. I unlocked my phone and scrolled through messages. Some senator wanted me to support him—nice quote at the end—and a star wanted me to explain to the world why she had an affair.

Rigson texted me: *U might want to come to sick bay. Something happening.*

I took a bite of my eggs and read it again. The waitress was back. "Tell you what, sweetheart, here's a tip, clean up my mess, and send the food to my room."

When I arrived outside sick bay, Rigson was so excited his purple shoes were untied. "There's a situation. Twenty are sick."

We were about to go in when Osi and his entourage met us. He was mad.

"I had to hang up on the American president to come, I'm sure he's furious. He'll get over it though, if he wants to get reelected. What is it?"

Rigson explained.

"So they got into space for the first time. Like you said in your article, they will be all right soon."

"I don't think so. See for yourself." Osi followed us in. Behind glass, a man lay on a cot. But he was screaming in agony, his hands over his face.

The ship's doctor was there. "We tried to treat it. It mutated. Now every time a new carrier contracts it, it takes half the time. One person has already died. That why I called you."

"Why do you have him in there like a caged animal?" I asked.

"Because that's what he is now."

"What's wrong with him? Why is he screaming?" The sick man stood, as if in answer, and began hitting the glass.

"It's a disease that attacks the tissues of the brain, turning them into acid; they begin to eat away at the skull, until the whole mess falls out. In the last minutes, the patients lose their mind and become violent. There's nothing I can do."

Osi started swearing. "Then we get them into the spacecraft, ship them down to Earth. I don't need this getting out."

"Not until we know if it's contagious. If it is, we'll all have to stay here. If there's no cure, we're not taking this thing back to Earth. It spreads through the air. Through the nasal passages it travels to the brain, where it starts to work. More like a bacteria than an illness."

"Who got this first?"

"A passenger."

"Where'd it come from?"

"I think it's coming from the fuel we're using."

"Fuel?" I asked.

"It takes a great deal of our special fuel to keep this thing running."

"Special fuel?"

Osi winced. “There are two engines, although you only know about what we call engine one. The other one is our own design. Using our own fuel.”

“What’s with this?”

“This fuel that powers engine two is a hybrid type, coming from a special substance found only in Peru. We had it mined from the ground. It breaks international law to use another form of this, which can be deadly, but we thought we had changed the chemistry enough to be safe. We had to keep the inspectors away, for obvious reasons. It’s loads cheaper, which is why I was able to fund this whole thing myself. That’s why it took such a short time.”

“Did you even test it?”

“The fuel would have only given off its dangerous vapors once it was being used under full pressure, like it is now. The breaking down is what causes this.”

The ship’s captain was radioed. He turned off furnace two. Only a moment later: “This ship is on fire. It’s engine one, sir. When two went off, the conventional one overloaded.”

Suddenly, a massive explosion. We were thrown to the ground. The ship was in flames. Osi screamed, “We are getting out of here right now!” He filled the air with expletives.

I roared back, “If we’re leaving, let’s leave!”

The door was thrown open as an announcement was made over the loudspeaker:
EVERYONE TO TAKEOFF BAY. DO NOT STOP IN YOUR ROOMS TO GATHER
BELONGINGS. DO NOT HESITATE FOR ANY REASON. GO IN AN ORDERLY MANNER
TO TAKEOFF BAY AS QUICKLY AS POSSIBLE.

We began running. Osi started to experience a headache of his own. Already electrical fires were bursting out of the walls as we passed. Small explosions rocked the ship. People around us were screaming. Here they were, more than two hundred thousand miles from home, all their oxygen on board this little thing that could crack like an eggshell. This was fear.

“Get into the ships, orderly now. The attendant will take your number. Do not overload, no pushing.”

I asked Osi, “What about the ones who are sick? We could all be carrying it.”

No answer. He fell to the ground, holding his head. The doctor grabbed him. “He’s got it and it’s going fast. I’ll inject him so he won’t feel it or lose his mind.”

I thought back to my history. The first king of Rome was named Romulus, but so was its last emperor.

I turned and ran to the group of guards who stood watching the people climb into the ships. I have no idea what I was doing. I didn’t then, either.

“We can’t let these people get back to Earth. We could kill off the entire planet. We’re probably all dying of it! Who’s in charge now?” The ship’s captain was missing—the fires, the screaming, the death. “With Osi gone, we can’t open those doors. Once we do, these ships take off, and all those germs go to Earth. We have to self-destruct this thing.”

The second lieutenant held up a phone. “Two buttons. One takes off, one self-destructs. I’m not pushing anything.” He was confused, afraid.

I held it in my hand. In front of us, people were loading. Little kids, people with lives and families back on earth.

“Last ship, enough room for all of us.”

We got in. I held up the phone. Another explosion. More screaming. I closed my eyes and pressed *Eject*. The bay doors slid open, but at that moment, there was a massive explosion, ripping off wings and hurling the spacecraft out in the wrong direction.

I heard screaming, glass shattering. The spacecraft had collided with one another. I kept my eyes closed as I felt myself falling. My head hit something, and life went black.



Lights beeping, sounds. The universe was still around.

The pilot was still in his seat. I laid him on the floor. The communications were down. I used the thrusters, what was left of them, to bring it down. Everyone else was dead aboard. The ship was careening toward the waves. I guess nobody saw it. I crash-landed and swam to shore here. The little ship had just enough fight left to get me down safely, and then it burned out and sank.

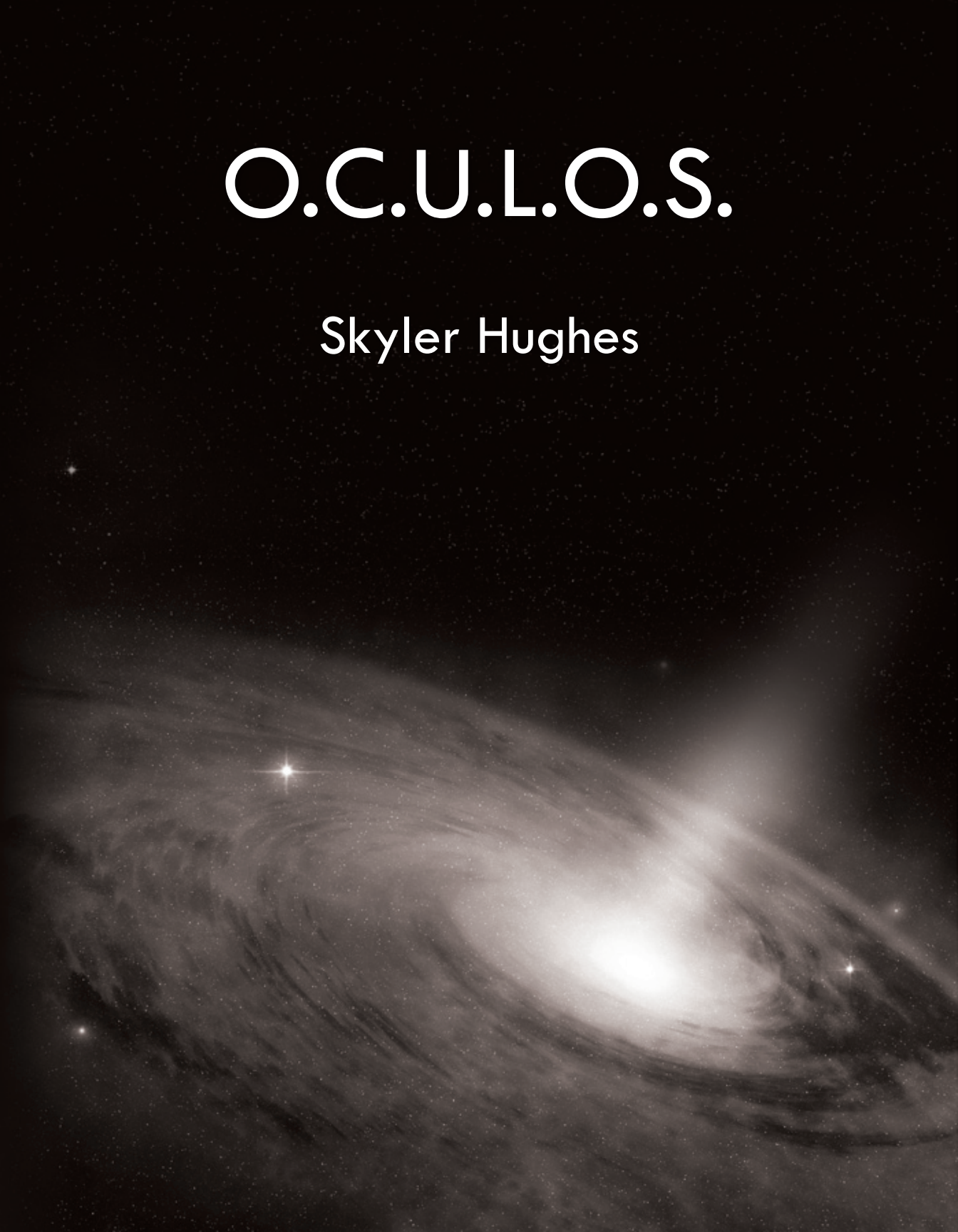
No one is looking for me, I'm sure of that. I guess I was immune to the disease. Anyway, I never got it. I'm still starving. But maybe that's okay. Someone will come eventually. Until then, I need to think, I need to clear my head. When I leave this island, if I leave this island, I will do it a new man.

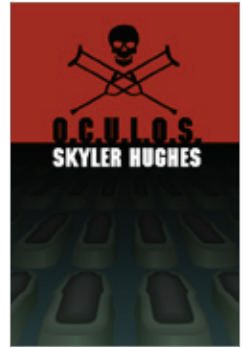
Our crime wasn't trying to conquer the heavens; it was hurry and carelessness. We didn't use the best, we didn't guard ourselves. Instead we rushed to get into the sky to see the Earth from above, and ended up falling back to it.

I'm here all alone now, and I'm tired. The hulk of a Lunar Hotel floats two hundred thousand miles above my head. More empires of space will come. More people will die. There will be more losses, and more victories, more difficult decisions like mine, and more horrible deaths. But behind all of it is a deeply human dream—to conquer the universe. It's not a bad dream, but if you dream while you're asleep, if you push ahead and kick down every safeguard because you forget they are there to protect you, you're bound to destroy yourself. Humanity! Go on with your exploration, but tread softly.

O.C.U.L.O.S.

Skyler Hughes





An asteroid of apocalyptic size was confirmed to impact Earth at ninety-three thousand miles per hour on August 10, 2042. The world's governments took immediate action, pooling all their resources and assets together for five years to send a rocket to intercept the asteroid seven years before its scheduled impact. For seven long years they waited, hoping that their thirty-five billion dollar investment would work, and it did. After that, people realized that long-term planning for disasters was the only way to prevent them. The O.C.U.L.O.S. program was born.

O.C.U.L.O.S began work in 2058. The program's goal was bold: to ensure that if any unforeseen problem happened on Earth and rendered it uninhabitable, humans would have already colonized other worlds. The United States' leading scientists worked on the project for generations. They finally prepared their first launch more than three hundred years later, on October 28, 2392, with two hundred eighty-two passengers on board, each one with training on how to pilot the ship and colonize a planet. For the next two hundred years they would drift in space, slowly making their way to a new planet called Hope.

Back on Earth, the O.C.U.L.O.S. program was receiving worldwide attention for its success in developing revolutionary new technology. A second Space Race was about to begin between old rivals to colonize distant planets. Russia wanted to be the first to colonize Mars, and seven years later they had launched a relatively simple rocket, called *сохранение* (*Preservation*), towards Mars with thirty-five passengers. Unfortunately its flight path was directly over U.S. airspace, and because Russia wanted it to be a surprise, they hadn't announced it. The U.S. thought that *Preservation* was a nuclear missile, so they declared it an act of war and shot it out of the sky.

Russia reacted with fury at the needless loss of thirty-five well-trained astronauts (not to mention billions of dollars) and declared war. Soon, there were thermonuclear warheads flying every which way, from many different countries. Not long after, the survivors of the war looked upon a planet that was barely habitable and full of radiation. Meanwhile, the two hundred eighty-two people aboard the O.C.U.L.O.S. ship were blissfully unaware of the horrors on Earth as they floated silently for the next two hundred years toward their new planet, Hope. Our story begins with them and a twelve-year-old boy named Leon.



I wake up in a cold sweat from a dreamless slumber. I feel like I've slept on a rock. The inside of my pod was usually very comfortable, but now it feels cracked and stiff. I try to get up and fail. I never thought that I would need my arms to pull myself up, but now I do. As I get up, my head hits the pressurized lid. Then I realize that I'm four years older—I'm now sixteen years old.

It feels weird to lose four years of your life, but it's what I signed up for, and it's not like I had a choice. My father is the captain of the ship, and I couldn't let him go without me. Still, four years is a long time and a lot of lost birthday presents. I guess four years of inactivity have rendered my muscles atrophied and useless. This new planet also seems to have a gravitational field stronger than Earth's—so not only am I weak, but I'm also much heavier.

Now that I'm sitting up, I use my arms to pull my legs outside the pod. I wonder for a moment how the pod really works. Traveling for two hundred years and only aging four is quite amazing. I reach for the crutches attached to the side of every pod. The scientists must have expected this to happen to our bodies. At the thought of "our," I remember that there are other people aboard this thing.

I look up, and the sight isn't pretty. The ship doesn't look anything like it did two hundred years ago. I guess the scientists hadn't accounted for the effect of two hundred years of nonstop use on the ship's hardware. Everything is dimly lit, and I can see paint peeling off the walls. Then I realize why the pod's cushions were flaky and stiff. Pieces of equipment are strewn across the floor. Some of the lights in the ceiling are flickering, or not working at all.

I hoist myself up and try to use the crutches. I laugh a bit: sixteen years old and I can't even stand up! I right myself slowly and I'm glad for the crutches; I'm quite literally hanging from my shoulders. The last time I had to use crutches, I was six years old. I had tried to jump off of the roof of our house into the pool; I missed the water by six inches and ended up with two broken legs. I never tried that again. I suddenly hate the crutches for bringing back that painful memory. Either way, I decide to use them—I won't be able to get around without them.

I look at one of the other pods and gasp. I can clearly see blood dripping from the seams of its pressurized door. I begin to hyperventilate; it's a good thing I don't have asthma. All the bloody videogames, horror flicks, and haunted houses could never have prepared me for the sight. I look around at more of the other pods; every single one has the telltale signs of overpressurization. Some pods' stains are old and faded, some are barely noticeable, but all of them are clearly damaged. Apparently the wear and tear of two hundred years had caused the pods to malfunction and overpressurize, killing the people inside. I imagined waking up in agony and suddenly exploding. I couldn't comprehend how lucky I was. All I could do was panic and fall to the floor. My heart raced. How could the scientists fail to recognize this fatal flaw?

I thought about the rest of the ship and the massive halls containing two hundred fifty of the two hundred eighty-two passengers. I imagine eighty-five thousand square feet of blood-soaked halls. Suddenly it hits me, and I half-gasp, half-scream, "DAD!"

I stand up as fast as I can and search my memory for anything that might help me find my dad, but I can't think of anything. I frantically hobble down the corridor, looking for any sign of life. After searching for thirty minutes, I'm totally exhausted. How can

I search the whole ship—the biggest and most advanced space structure of all time—when I’m not even fit enough to stand? I crumple to the floor.

I’m exhausted; I can barely breathe. I wish I had listened more during training; back then, I thought, “Why do I need training to fall asleep?” All I know is that two hundred fifty of the passengers were housed in B-wing, and the rest on the bridge. Suddenly, I remember that each person was given a map listing every passenger’s name and pod location. I still have my map folded in my pocket! I laugh gleefully, and perhaps a little bit too hysterically, and reach into my pocket.

When I pull out the map, it tears in half and crumbles into tiny fibers. The effects of two hundred years on paper. Great, just what I need, more problems. I stop for a moment, sighing, and breathe. If I’m going to find my dad, I need to keep a level head.

I’m trapped on a two hundred-year-old ship falling to pieces on a planet with no communication, no family, no way to find them, and no idea what to do. Evaluating my present situation isn’t going to help me keep a level head. I wonder what the most logical course of action to take is.

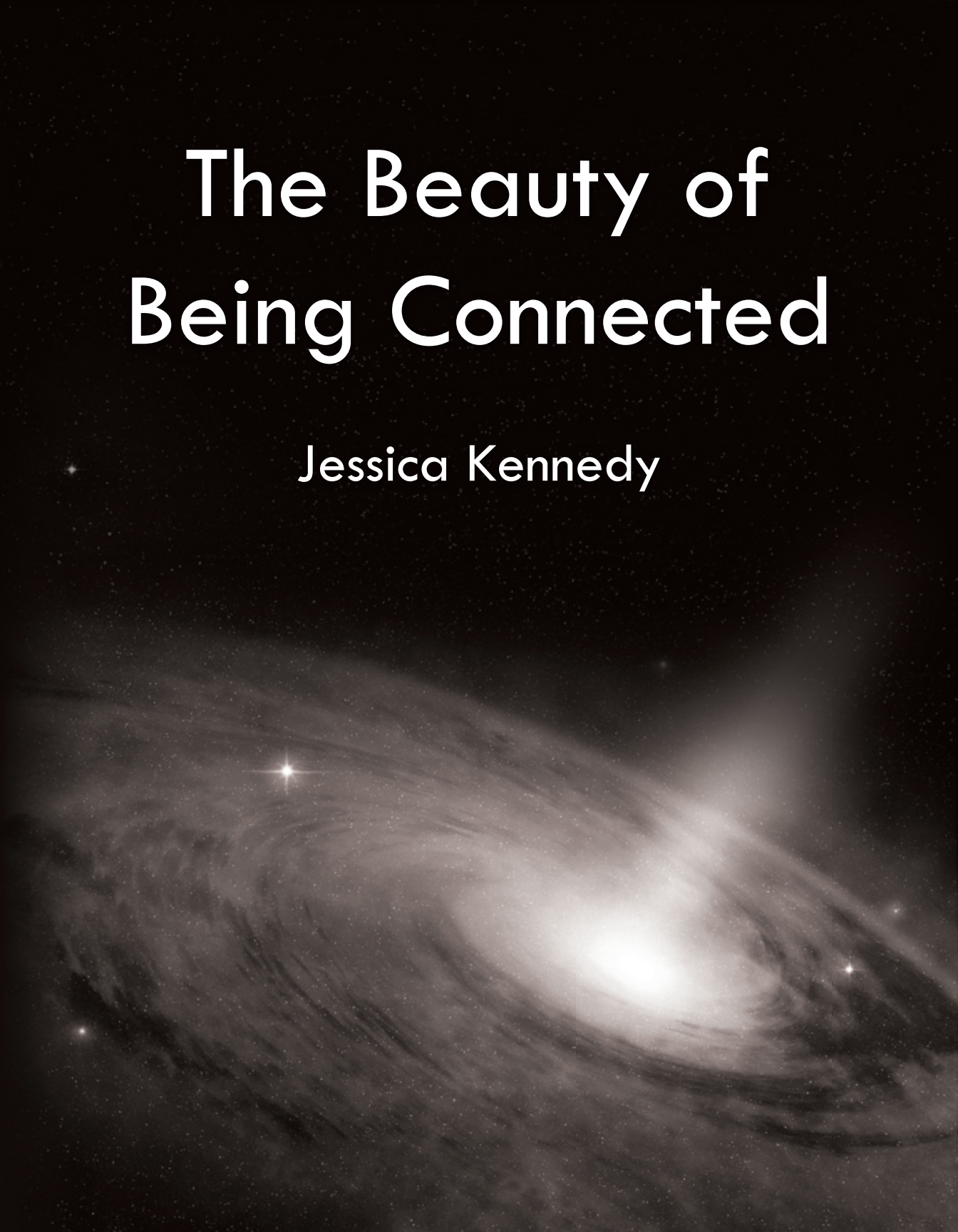
After a mere fifteen-minute battle in my head, I decide to forge on and continue to search for other survivors. My pod can’t be the only one that hasn’t malfunctioned. This time I search a little less frantically for pods without signs of overpressurization. The pods are arrayed in long rows in a bunk bed configuration. I’ll have to search hundreds of pods for survivors, and for the expeditionary ship for survivors who may have already woken up.

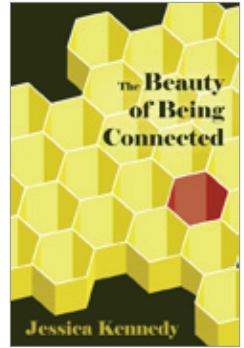
Dad had told me that the two of us would wake up an hour before the other passengers when the time came, to prep the expeditionary vessel. So any survivors of the malfunctions should start waking up about now. I wait quietly, listening intently for five full minutes. Just as I’m about to give up and go look around some more, I hear a sudden hissing, followed by a mechanical screeching sound. The sound of a pod opening.

It’s coming from somewhere behind me, somewhat faint. It must be from B-wing. I hobble down the corridor as fast as I can. I frantically scan with my eyes for any signs of life. And there, about forty feet away, I see...a hand.

The Beauty of Being Connected

Jessica Kennedy





Rusted metal chains clinked together, the first sign of life in days in the cramped, damp room. Dried blood from months past stained the floor, spilled from wounds that may or may not have been cleaned. Infection was kept at bay only because no other pathogens could've gotten into the cuts and gashes on a person forced to kneel, her arms pulled up by chains. Her hair, clumped together from being unwashed for so long, fell over her eyes. Her whole body ached because of the position she was forced into. She had been hanging there a long time, but she still cried, the only form of resistance she could manage.

A gruff hand pulled up her wilted head and stared at the eyes that were half shut. After one firm slap, the hand's owner gave up on trying to get a rise out of her. There were others down here who were far more interesting to play with. Boots smacked against the cold stone floor, reminding her of proper clothing instead of the rags she wore.

"You've come to enjoy this, haven't you?" The voice of one of the wardens was as harsh as his actions; it was a noise she seldom heard, and not a pleasant one. But no matter how many times the words cut into her, she still clung to them. At least someone spoke to her, even if that person hit her. The cruelty didn't pass her by, though, and each time it worsened her condition.

Her.... What was her name? She had one, she knew that much. Deep in her soul the echoes of her name bounced around, and she would look at that spark of light every once in awhile, reminding herself of the idea of a name. And then the idea of a soul. It would be so much easier to forget she had one of those, but it persisted. Even when she was at her numbest, there was this stupid thought that she was somebody with importance and weight.

Something within her clung jealously and possessively to memories of days when she was her own self, a person with ideals and goals and a personality that filled her from head to toe. It wasn't a form of hope, but more of a distant dream—a kind of torture even the wardens couldn't replicate. When she was feeling adventurous, she would pretend she was that person again and rattle her chains gently, until the wardens reminded her of her place.

Once she really was free, under a real sky with real clouds and a real sun that provided real warmth. Once she had struggled against her bonds and spat in the faces of the wardens. Once, such a long time ago, she knew how to get out, but hadn't possessed the ability. Now, maybe circumstances had changed or maybe they hadn't, but she didn't know how to leave. All she knew and expected lay within three walls, two chains, and one cruel man who stopped by when it suited him. Sometimes she would rattle the chains to remind herself of what was there, to entertain the idea that it would take just a little effort to get the hell out.

The fear of pain kept her in. Moving again would be agonizing, getting up off her knees and straightening her back and then taking steps forward. Even if she succeeded in that, which she doubted, the wardens would be waiting for her. They wouldn't even have the decency to chase her and pretend as if they were actually worried about her getting out. No, they would stand in the corridors, wait for her to walk by, and beat her senseless before they allowed her to sulk back to her room. The chains she could slip in and out of as she pleased; their purpose was to keep her from hitting the floor and being knocked around by the wardens too much, not to keep her in. The wardens did that job better than any chains or bars ever could. She thought about this often, trying to figure out how best to slip by them, but nothing ever worked, so she stayed.

The pain made her think of these ways to escape. There was no day or night, only eternity. There wasn't a time, except for sleeping hours, when her body didn't hurt in some way or another. She hadn't experienced true, honest kindness since she arrived here, whenever that was. Hope and rebellion had faded long ago. Living was monotonous. Yet she was still human and retained her emotions, which was where the pain started. She ached to scream and make noise and do something, attack the

wardens instead of sitting there limply like a doll, but the energy and resolve for those kinds of actions no longer existed inside of her. The human reactions of anger, despair, and longing remained when the rest of her impulses fell away, leaving her with the pain. She knew that pain though, inside and out. It was enough; she didn't need a new kind of pain to deal with, which was why she stayed where she was. To her knowledge, there was no way to get out without new hurts that were worse.

If only the loneliness would go away, then maybe she could get on her feet and push her way through. No one cared enough to come and get her, so it stood to reason that no one would care or notice if she came back. However, if a person did show up, she wasn't sure she'd know how to deal with them. For all she knew, people had stopped by but she hadn't found the energy to realize they were there and acknowledge them.

This place she'd been shoved into—she was fairly certain she wouldn't have come here on her own—had no life in it. Anywhere would be better. Somewhere she could just exist would be lovely, but this was only a dream. The outside world was a figment of her imagination, exactly like the thought of escaping. There still lingered the distant memory of a more pleasant place where people were connected, where she belonged and thrived. Perhaps if she could only remember the way out, rattle her chains one more time...

Rusted metal chains clinked together, the first sign of life in days in the cramped, damp room...



A white lab coat blended in with the sterile white walls and bleached white floors that comprised the institution. The man wearing the coat, tall with a shock of black hair and eyes only a few shades lighter, stood in front of Guest #43915, reading her vital signs off of an ultrathin tablet. It occurred to him while scrolling through her information that they hadn't upgraded their technology in some time; it had been six months since the last time they had received new tablets, leaving them four upgrades behind the latest

model. He sent a message to his superior as he placed the tablet back on the wall where it could refresh itself and update the guest's status.

A moment went by where he stood watching her sleeping form strapped to the wall. An IV in her arm provided the fluids and the necessary compounds and nutrients she needed to live. Looking at her from the other side of the glass, it didn't seem like such a bad thing for her, especially considering her condition. She dreamed in a REM-like state between waking and true sleep, instead of living out a miserable life within the rest of society. Everyone would be afraid of her if she walked around, no exceptions. She was a plague and a bane to others, to be polite. She couldn't handle the hive mind humanity now used to communicate. The man returned to his desk, his hourly run finished. His job was to check on the people kept here and ensure they were safe and taken care of.

Even though there was no one else on this floor, he was never actually alone. Colleagues would contact him mind-to-mind, the soft brush of another consciousness against his own telling him someone wanted his attention. A small biomachine, or BiMach, fused behind his ear allowed him to talk to whomever he pleased, as long as he had met them before and they had a BiMach as well. People would share experiences and information over the Hive, as it was commonly known, creating an age of cultural richness and heightened empathy. Few argued that the Hive was a negative thing.

Those who did argue were usually related to the people here. He picked up the coffee sitting on his desk and sipped at it while scanning the rooms containing the unstable people of this new world. They were the ones who shouldn't have been granted access to a BiMach, but had somehow gotten their hands on one anyway. It made him shudder to think of all the damage they could cause if they were allowed out in the world, into the Hive. An underlying problem before they ever wore the BiMach, or a disagreement between their brain chemistry and the tech—or something else entirely—caused them to spread a kind of sickness in the Hive. Their presence made others fearful, angry, and irrational. This place, commonly called “the White Castle,” was created to contain the damaging ones while a method for removing the BiMach without hurting them was developed. Keeping them under was the only way to protect them from the Hive, and the Hive from

them. Over time, they would drive other people and themselves mad. They couldn't deal with the constant contact, so they lashed out. Dreaming was such a better option.

Despite the controversy it caused, he couldn't see another way for these poor souls. Besides, most of them had put in the BiMach despite being told they would never be able to handle it. It was their fault they were here. A familiar contact pressed itself against his mind, and he pulled himself away from thoughts of work to talk with his wife about what their children had to do after school while he began his paperwork for the day. She told him about their son, who was so proud of being able to tie his shoes for the first time before leaving home today. A smile broke out on his face as he learned of his son's pure pride at the new accomplishment.

This was why he loved the Hive and wouldn't change it for the world. It was beautiful in so many different ways and allowed humanity to become greater. World leaders had come to agreements from meeting each other through the Hive and realizing things about the situation they could never have understood through words alone. Divorce rates and suicides had plummeted while tolerance and innovation had skyrocketed since its implementation fifty years ago. The only problem was the people who insisted on sticking their noses in the Hive when they didn't belong there. But that could be solved here, temporarily, while a better solution was in the works. He was doing his part for humanity by working here and keeping these people under. The world was a better place.

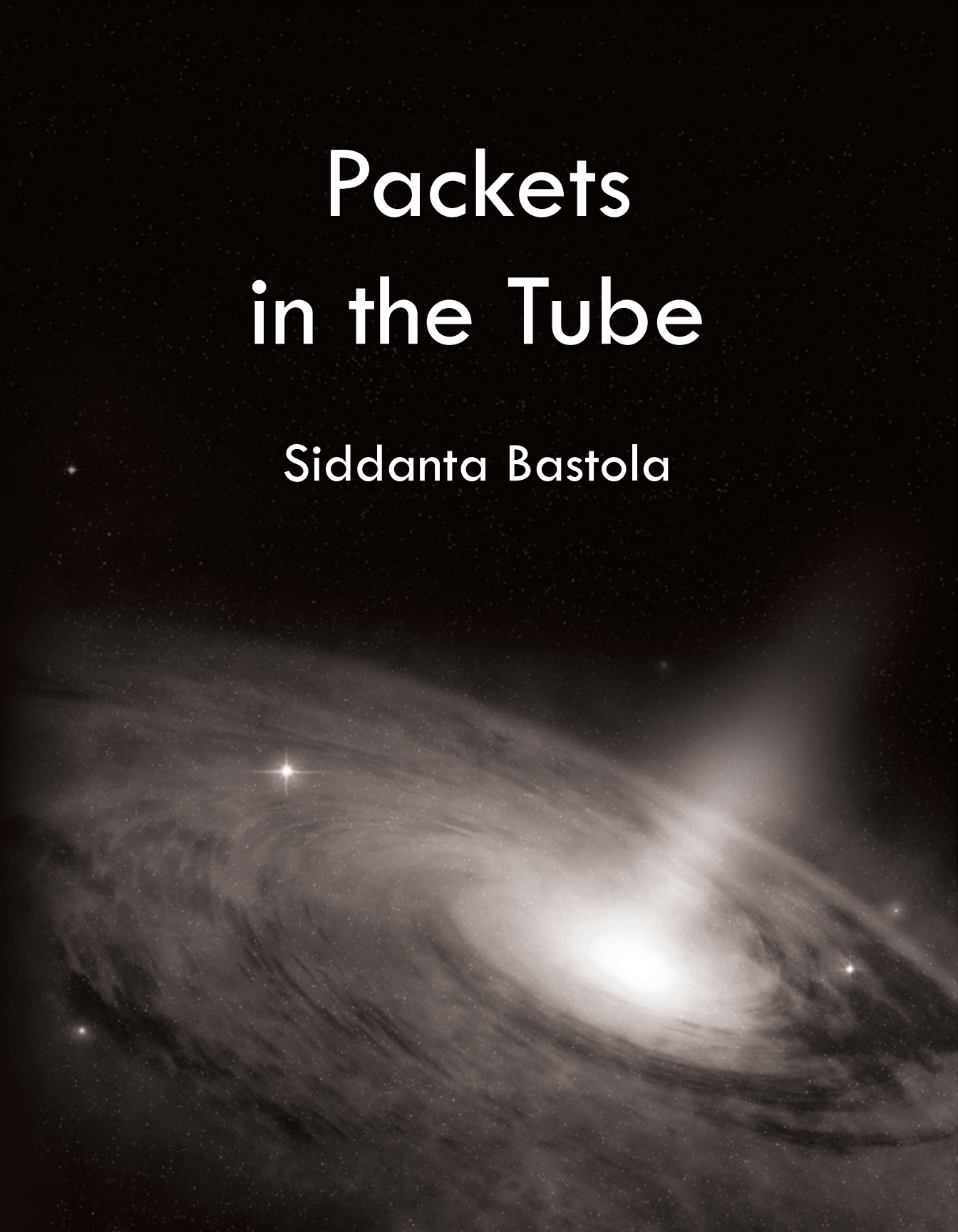


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Packets in the Tube

Siddanta Bastola





Imagine a world where physical remoteness is perceived as a tyranny no more—where the entire Earth is pressed to a single point. Imagine a world where people commute to work halfway across the globe, allowing them to live in the far-flung places without missing out on the luxuries of large cities. Imagine a world where physical objects are downloaded and uploaded like electronic data files. Imagine a world where words like “kilometers” and “miles” are rarely spoken by the common people.

This is the year 2063 CE. The Tube revolution is in the full swing. Built almost thirty years ago, the Tube is the superhighway of the mid-twenty-first century. It started out as a science fiction story penned in 2013 by a sixteen-year-old boy, Siddanta Bastola, as a part of a sci-fi competition. This idea was later seized upon by MIT professor Jotaro Ito, who along with his graduate student, Isaka Sawadogo, designed the detailed protocol stacks and a working hardware prototype in 2019. Jotaro and Isaka’s work was built on the foundation of two relatively new technologies: a packet-switched global electronic network called the Internet and a super-fast transportation system made of steel tubes called the Hyperloop.

If the mid-twenty-first century was all about the Tube revolution, the late twentieth century was all about the Internet revolution. The Internet heralded the information revolution by enabling near-instantaneous transmission of data packets across the globe using an interconnected system of computer networks. Individual connections in the network could be electronic, optical, or wireless, and they could be part of a private, public, or academic network. Based on the packet-switching IP protocol, data packets were directed from one router or computer to another using pre-calculated routing tables. Each computer or node was identified by a unique IP address. The Internet was a

truly distributed network with a high degree of fault-tolerance, and as such, there was no central governing body. The government of the United States played a major role in the development of ARPANET, the first functional packet-switched network linking major universities and research laboratories, which later evolved to become the global Internet.

As late as the beginning of the twenty-first century, the main modes of transportation for people and goods were airplanes, automobiles, trains, and ships. It would take hours to travel from New York to Paris and it would take days, if not weeks, to transport manufactured goods from Guangdong to San Francisco. All of this began to change when Elon Musk proposed a much faster tube-based transportation system called the Hyperloop. Built upon the earlier concepts of de-pressurized tube-based systems, the Hyperloop had specialized pods riding on a thin cushion of air inside steel tubes to reduce friction. Those pods were given periodic boosts by linear induction motors to maintain subsonic speeds. The Kantrowitz limit was overcome by mounting an electric compressor fan in the front of the pod to continuously transfer high-pressure air to the rear of the pod. These tubes were elevated on pylons and were powered entirely by solar panels mounted on the top of the structures. A completely functional Hyperloop link between Los Angeles and San Francisco became operational in 2017, reducing the ground transportation time between the two cities from five hours to half an hour.

When MIT's Jotaro and Isaka proposed the marriage of the Internet and the Hyperloop, the wheels of the Tube revolution were set into motion. With a renewed focus on green energy to reduce the nation's addiction to foreign oil, the U.S. government decided to "upgrade the Internet" to transport physical stuff, including people. By 2033, all major U.S. cities were linked by the Tube. With a trans-Pacific link between San Francisco and Osaka operational in 2039 and a trans-Atlantic link between New York and Paris completed in 2040, the Tube really took off as a global network. Much like the Internet, individual links are owned and operated various private and public entities. These service providers, called ISPs, charge customers a service fee for providing an access to the Tube. A typical Tube section consists of outgoing and incoming steel tubes, running next to each other. These tubes are held above the ground using pylons. Analogous to

intranets' relationship to the Internet, every home or office building has local tubes that feed to the larger system. These IntraTubes cater to transportation needs inside a house or an office building—for example, moving workers among different buildings on a campus.



2061 Independence Day, 8:30 PM, San Francisco, USA

Eanglizzlis, her husband Etchlioslike and her four-year-old daughter Eathrins are watching fireworks on their TV. Dizzying colors of alphabets and cartoon characters fly across the sky, showcasing the latest pyrotechnic technology. While everyone is in a cheerful mood, Eanglizzlis asks Etchlioslike about their dinner plans.

“I’m craving pizza,” says Etchlioslike. “Me too,” adds Eathrins.

“All right, let’s go with it. I love the Roman pizza from Pizzeria Leoncino.” Eanglizzlis pulls the enohpi from her pocket and asks Iris to place the order—“Iris, can you please order a Pizza Quattro Stagioni from Pizzeria Leoncino?”

“Sure thing,” says Iris. After a moment of silence, Iris confirms that the order is placed successfully.

8:45 PM: The Tubicle (the room with an access ramp to the Tube) bell tinkles.

Etchlioslike hurries into the Tubicle, opens the pod door and picks up the pizza box. It is quite warm, and smells fresh. The family enjoys their authentic Italian pizza.

For the Italians, making a pizza is like creating a work of art. Every pizza is handmade and cooked in a wood-fired oven with a seven-inch thick stone floor. All pizzas are cooked directly on the surface of the oven floor and not in any kind of pan or container. For hundreds of years, every pizzaiolo has been preparing his masterpiece in this time-honored tradition. What has changed recently, though, is how the cooked pizza is delivered to the customers.

The pizza is delivered by placing it in a pod inside the Tube, which is then packet-switched from one tube-link to another by multitude of pod-routers. Pods have their destination ITP address digitally stamped on them, and they constantly communicate this address to the next hop pod-router. A pod router has an ultra-fast pneumatic path-switcher that will connect the input tube to the chosen output tube. Like Internet routers, these pod-routers use the routing tables to route pods to next hop router or destination. Route discovery is accomplished using a protocol very similar to Internet Protocol.

These pods are transported from one pod-router to next by the Hyperloop+, which currently operates at 100,000 miles per hour. It took only 3.74 minutes to get that pizza prepared in Rome delivered to a house in San Francisco.

2061 July 5, 8:00 AM, Ghandruk, Nepal

Oshana, a single mother, has just finished her breakfast of Eleusine coracana (millet native to the Himalayan region, locally called *Kodo*) pancakes. Originally from Reykjavík, she moved to Ghandruk for its awe-inspiring beauty and its still-thriving indigenous culture. Oshayn, who is just eleven months old, has barely started to stand on her own.

Oshana commutes to her work in Slab City, California, where she works as an anthropologist in a Tube startup company. While looking for a childcare provider for Oshayn through the long-running and popular classifieds portal Craigslist, Oshana found Us'on Care, located in Hokkaido, Japan. Us'on provides esteemed but expensive *Ching-Ching time* to its babies, in which complex, algorithmically-generated musical compositions are used to stimulate every single neuron in a child's brain each day. The child's brain is continuously scanned to generate a neural connectivity map, and based on that live data feed, a supercomputer generates the correct musical notes. Many of the babies who are exposed regularly to Ching-Ching time grow up to become geniuses.

8:05 AM: Oshana is ready for the office. She carries Oshayn to the Tubicle, places her in a baby pod and gives her a kiss. Oshayn smiles and waves goodbye. Oshana selects "Us'on" on the attached touchscreen panel and then presses the "go" hardware switch.

The pod whisks away with a faint whoosh. She heads back to the kitchen and pours herself a cup of coffee.

8:06:55 AM: Oshana's enohpi chimes a "complete" alert tone, signaling that Oshayn has been successfully retrieved at the other end. After finishing her morning coffee, Oshana enters the Tubicle, straps herself inside a pod and presses a programmed button to whisk her to work. Since her startup is housed in a massive spaceship-like complex, navigating the interior of the campus is a time-consuming task in itself. Luckily, her company has implemented IntraTube, a localized version of the Tube for their internal transportation needs. Oshana lands in the complex's gateway station, and the IntraTube whisks her directly to her workstation. At 8:10 am, she is "dropped" into a chair in her magnificently decorated cubicle.

Every house has a 256 bit ITP address (InterTube address). Above the roofs are steel tubes where pods are zipped across the globe at blazingly fast speeds. With the major backbone tubes operating around 100,000 miles per hour at top speed, this has indisputably revolutionized how people live, work, and enjoy the indulgences of life. Not only electronic files, but also physical objects can now be downloaded and uploaded through the Tube. This has completely transformed the retail business. Gone are the days of browsing still images or videos of products online; now products are downloaded directly to consumers sitting on their couches. If they like the products, they keep them; otherwise, they simply return the products to the retailer in seconds by uploading them.

2063 July 5, 9:00 PM, Johannesburg, One World

Lakninnika is a twenty-two-year-old Pneumatics student who lives in a college student house with her best pal Lakayzel. Tomorrow morning they are Tubing to Chennai to attend Lakninnika's brother's wedding. Since the wedding will have an Indian theme, everyone is encouraged to dress in an early twenty-first century Indian costume. Lakninnika and Lakayzel are frantically searching for the best lehenga on their enohpi. They find a good selection on a popular portal called Niles. They select four brightly colored lehengas and opt to download them for a trial fitting. In about two minutes, the

Tubicle chimes to signal the successful downloads. Lakninnika and Lakayzel both try on all four lehengas. Lakninnika chooses a turquoise green and pink circular pure crepe lehenga enriched with silk. Lakayzel chooses a royal blue net lehenga designed with resham, gota patti, and patch border work. Glad that they found outfits for tomorrow's event, they electronically pay for the two lehengas and return the others to the retailer by uploading them through the Tube.

Up to fifty-seven percent of workers now commute regularly across the oceans. Since commute time is no longer a critical issue, a lot of people are now migrating to the Himalayan region for a cooler climate and lower cost of living. Because of the Tube, political borders are breaking down quickly. Except for the United States, Japan, Nepal, and Italy, all other countries have formed a new political union called the One World Federation. These four countries with exceptionally advanced Tube economies and robust transportation infrastructures are worried about losing their technological advantage if they join the Federation. U.S. president Kale Abrader is pro-dismantlement and is trying to convince the American public to join the Federation, arguing that it is a futile exercise to resist the inevitable.

There is also the very serious social issue of tubicle divides between those who have access to a fast, reliable Tube infrastructure and those who don't. Prominent sociologists have recognized the tubicle divide as the number one potentially explosive issue for the upcoming generation. Massive human migration on an unprecedented level is happening around the globe, as people take advantage of the Tube's speed to move to formerly remote regions of the Earth.

Tube technology has completely transformed supply chain management for manufacturing. Raw materials needed for factories are whisked on-demand from suppliers all over the world and made available on the factory floor just in time for production.

2063 July 5, 9:00 PM, Guangdong, One World

Urdribi is the general manager of Foznixx, the largest contract manufacturer in the world. Most famously, it makes the insanely popular and ubiquitous enohpi. Ingredient inventory management has been the most challenging issue for Foznixx, even with the implementation of a Just-in-Time (JIT) philosophy. It is hard to predict the actual enohpi demand in advance, and because of this, Foznixx has been conservatively stockpiling enormous amounts of component parts. This has cost Foznixx millions of Bitcoins, due to storage costs for these extremely delicate parts. Today, Urdribi is officially inaugurating a new production plant based on the Just-in-Moment (JIM) philosophy. Pioneered by Usleyrron, a brilliant engineer and Tube enthusiast, JIM has been shown to significantly cut costs and improve the throughput of factories. Foznixx's new plant has no storage space. All production line conveyors are "live" with Tube connections, and parts are pulled from the different suppliers on-demand. As the JIM mode was switched on, Urdribi experienced a moment of pure joy—parts from all over the world coming together in a moment's notice to create a final product.

With the advent of the Tube, personal use of automobiles is almost obsolescent. An aerial survey of a typical neighborhood shows rows and rows of solar panels mounted on the top of the steel tubes running above the houses. With no funding for maintenance, roads are disintegrating quickly. Most bridges have already collapsed, and vegetation is taking over the concrete and asphalt highways. Petrol stations are frequently converted to playgrounds for kids. Most cars have been scrapped and recycled. With most of traffic lights out of service, and police patrols nonexistent, it is now considered dangerous to drive. Young people visit museums to learn about the Golden Age of the Automobile.

2063 July 5, 9:00 AM, Los Angeles, USA

Arcun is a retired truck driver who officially became eligible for the Social Security benefits two weeks ago. Arcun started driving trucks right after his high school and never looked back. It was tough work with long lonely nights, but he loved it, because it enabled him to visit new places and meet new people. He lived through it all: people

driving with abandon when petrol prices were low in early twenties, alarm about anthropogenic global warming, Tesla's electric car revolution, and the promise of the Hyperloop. Today Arcun is taking his thirteen-year-old twin granddaughters Asteb and Auttika to a petroleum-powered automobile enthusiast club in Mohave Desert where he is a regular. Petroleum has become a dirty word, and a strict quota regime is in place for its production and consumption.

At the entrance of the club is a sign with a warning in big red letters—the exhaust fumes from petroleum-powered automobiles can cause dizziness and nausea for some people. Arcun takes Asteb and Auttika to the second level of the museum to see a giant replica of a six-cylinder internal combustion engine, complete with a petrol intake valve, an exhaust port, and a rotating wheel attached to the piston.

“Grandpa, where did the petrol come from?” asks Auttika.

“Those days, petrol was the most coveted currency in the world,” replies Arcun. “Many wars were fought for access to fossil fuels. A lot of people got rich by digging holes in the ground and extracting the black gold. There was a massive infrastructure for the petroleum supply chain; they had petrol dispensing stores on every block, just like those.” He points to a replica of a petrol pump nearby.

“Why did they become so common?” asks Asteb.

“Well, they were plentiful in the beginning, and they contained a lot of energy in a small volume. More importantly, a lot of powerful people had vested interests in the petroleum economy, so they actively discouraged any alternative sources of energy.”

“So why did the pumps disappear?” asks Asteb again.

“First it was a compulsion. There was a limited supply of petroleum in the world, and it was running out fast. Second, global warming turned out to be real, and it scared the hell out of people. And finally, once Professor Ito demonstrated the working prototype of the Tube, it was a revolution that nobody could stop.”

Arcun takes the girls for a ride around the racetrack in a 2014 Corvette. “Put your seatbelts on; this thing can be dangerous at times,” he shouts as the engine starts to roar. It is a hot day in the desert, and the tarmac is radiating so much heat into the air that shimmering mirages can be seen in the distance. It’s a slow ride at sixty miles per hour, but the girls seem to enjoy it thoroughly. It’s an utterly novel experience for them.

“I know one good thing about this,” says Auttika. “Having the whole family ride in the same box and go somewhere together on a long journey would be so cool.”

“Definitely,” says Arcun. “There was a word for that: it was called a road trip. It was a family tradition for most Americans. Today we’ve become little bit more insulated.”

After a few more hours at the club, it’s time to go home. Arcun, Asteb, and Auttika walk toward the Tubicle, which sports a neon sign—“Beam me up, Scotty.” Yes, the Holy Grail of science fiction is now just about real. Welcome to the brave new world of the Tube: a globe-spanning network of tubes.

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