

**REEL Rangers Adventure: Volatile Moon**

**By Darrell T. Boyd**

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**Dedicated to William R. Wood**

**Special thanks to my wonderful mother, Corine Norwood.**

**I deeply appreciate the love and support of Joyce Morrow-Jones.**

## **PROLOGUE**

### *The Kettle Point Purge*

During the mid-21<sup>st</sup> century, the consequences of global warming began to wreak havoc throughout Earth. Yet, a most unlikely and unnatural geological event – an earthquake in the state of Michigan - precipitated a perfect storm of environmental, industrial and political catastrophe that changed the game entirely. All attributable to the unique circumstances surrounding Michigan's natural gas hydraulic fracturing or “fracking” industry. The fracking process consisted of injecting high-pressure fluids into well-bores deep underground, inducing fissures in shale rock formations, thereby allowing natural gas to flow freely. This process resulted in millions of gallons of waste water “flowback”, which ironically was disposed of through underground injection. Compounding this scenario, Michigan illegally accepted radioactive sludge from other states for disposal by underground injection with the consent of the Environmental Protection Agency (EPA), and in collusion with the natural gas industry and state

officials. Most problematic, the radioactive sludge, formerly called, Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM), could not be traced.

A man-made perfect storm of seismic activity developed from thousands of hydraulic fracturing wells, thousands of fracking waste water disposal wells, and thousands of illegal radioactive sludge disposal wells. Originating in the Antrim Shale Basin, the resulting series of minor earthquakes, like cascading dominoes, caused catastrophic damage to groundwater aquifers throughout the state. Toxic and radioactive waste water escaped into Lake Huron to the shores of Ontario, Canada. On day one, millions succumbed to illnesses, before the public was alerted that their drinking water was horribly polluted.

The Canadian government demanded an immediate cessation of all hydraulic fracturing activities in Michigan and access to every disposal well in order to monitor any possible source of pollution to Lake Huron. The State of Michigan, supported by the federal government, refused to comply with the demands of Canada. In a show of force, Canadian Armed Forces mobilized and assembled at Kettle Point, Ontario on the southern shore of Lake Huron. Michigan National Guard prepared for invasion. The United Kingdom intervened to stall the impending conflict. Due to the fact that government on every level failed to protect the environment, a non-governmental authority, was needed to assume responsibility - environmental, industrial and political. A relatively new organization assumed the leadership role, Renewable Elemental Energy Law Rangers – REEL Rangers.

Known as *The Kettle Point Purge*, a precedent was established to provide a platform for a non-governmental organization (NGO) to supersede sovereign authority. The consent of all parties elevated REEL Rangers to supra-governmental status. In the following years, hope to restore Earth's ecosystems persevered in the form of a growing global force. The year 2072 marked the 50<sup>th</sup> anniversary of REEL Rangers. Founded in 2022, REEL Rangers were established in order to advance and support renewable energy initiatives and programs that help to develop, sustain and safeguard the five renewable energy sources: Biomass, Solar, Geothermal, Wind, and Water. During decades of extraordinary expansion, REEL Rangers were recognized by every sovereign entity on Earth.

REEL Rangers Institute was established to advance the goal of ecological sustainability throughout the global community. REEL Rangers developed and implemented pragmatic and innovative methodologies for reducing the ecological impact of communities, corporations, and nations. The Institute established the following objectives:

- Promote sustainability projects and foster ecology education;
- Formulate methodologies for reducing carbon footprints;
- Provide measurable outcomes for sustainability projects;
- Promote ecological awareness and environmental justice;
- Challenge industries to proactively reduce their carbon footprints.

By 2070, the Institute maintained over 140 campuses around the globe, providing comprehensive curriculums in the sciences and the humanities. Starting at age 12 and continuing through post-graduate studies, students were cultivated to excel in environmental sciences and renewable energy solutions. The Institute encouraged each student to develop strength of mind, body, and character to the highest levels. The Institute fostered a universal *Restore Our Earth* spirit by inspiring enthusiasm, devotion, and strong regard for the honor of the REEL Rangers.

## Part I

*REEL Rangers Institute, Cleveland, Ohio, United North American States (UNAS)*

“Ranger flight 913, this is Lakefront Control. You are cleared to land on runway 2A. Welcome back Deputy Chief Mays. Hey, how's the ride in that souped-up glider of yours?”

“Copy that Lakefront. And the LectricJet ride's as smooth as butter, as long as there's no headwind,” Mays answered jokingly. Dry-mouthed and damp with sweat under his flight-suit, Deputy Chief Tremaine “Tree” Mays, was anxious to get down to the Institute for his “meeting” with Chief Carvalho and get back to his shale-gas clean-up project in Ontario. Looking back to his right, Tree could see the orange-red glow of the sun setting into Lake Erie, illuminating the scattered clouds. Heading towards the shoreline, he saw starry white lights, dispersed like a constellation over a wide area of the expansive surface of the ocean-like lake. The Erie Wind Farm contained hundreds of huge wind turbines, each one shining like a lighthouse.

Releasing the autopilot mode of his LectricJet, Tree descended precipitously from cloud level to scant meters above the wave caps as he approached the Institute's lakefront airport. The adrenalin rush from his stomach to his head made his temples throb with intense pleasure mingled with the aching shift in altitude. Piloting the small two-seater electric engine jet was the sole self-indulgence he entertained while on duty.

After a flawless landing, Tree waved off the ground shuttle driver and took the long walk across the tarmac to the HQ building for his meeting with Division Chief Carvalho. Tremaine carried an impressive physique at 1.84 meters tall, lanky, but well-muscled. Sporting a purple jumpsuit and cap with “Restore Our Earth” embroidered in gold, Tree looked regal with penetrating deep-set eyes, a thin beard tracing his well-defined jawline and skin the color of cinnamon. Although he appeared serene and confident, a surging anxiety now washed over Tree as his right eye began to twitch - a telltale warning of trouble on the horizon. It was a sure sign that he should proceed with caution and gird himself for the worst. These eye spasms, induced by a feeling of dread, taught him to prepare for potential calamity looming nearby.

A knack for dealing with adversity proved to be one of his greatest assets. Tree possessed an uncanny resourcefulness highly regarded by his fellow REEL Rangers. He also possessed the unique ability to provoke his adversaries to the brink of rage. Tree was summoned again to respond to charges for exceeding his authority as the recently appointed Deputy Chief, Industrial Refuse Reclamation Division (IRRD). This was not a designation of honor. It was his only opportunity to remain a Ranger after being booted out of the Forestry Division for similar misconduct.

Enjoying the lake view from his glass-domed office, Division Chief Carvalho reclined in an antique barber's chair from the 1950's loaded with hi-tech amenities. He savored this moment to clear his mind while meditating on the amber sun setting into Lake Erie's horizon. A brawny silver-haired Native-American, Carvalho resembled a bald eagle perched on high scouting for vermin below. He tended towards intolerance but was somewhat yielding in his turbulent relationship with Tree. Carvalho swiveled away from the expansive window view of the lake to

stare silently at Tree who strode ardently into his spacious, but scantily furnished office. Tree casually took a chair directly opposite Carvalho with no desk between them.

“Deputy Chief Mays, this is the seventh official complaint filed accusing your unit of using strong-arm tactics while monitoring industrial reclamation operations. Seven complaints in the past six months. That’s more than once a month that I handle your garbage!” argued Division Chief Carvalho.

“Now, listen up Chief...” Tree interjected.

“Listen who? No, *you* listen, you slime-water guzzling greenie. That uniform and insignia you wear represent REEL Rangers, not Texas Rangers. We do not carry a big stick because we do not enforce the law, we encourage compliance with the law! Our objective is to help corporations comply with environmental and ecological guidelines for sustaining natural resources. If you're having trouble with this concept, perhaps I'll send you back to the Academy for some remedial training. Just think back on why you were kicked out of the Forestry Division and sent to me to clean up industrial waste. Your people skills haven't improved, not one iota.” Mentally checking his pulse, Carvalho sensed it was too soon to get emotionally revved up before ultimately forcing Tree into a corner. Softening his crusty gruff voice, Carvalho continued, “The good news, Tree, is that you get to keep the uniform, insignia and rank, for a while longer. Now here’s the bad news. Your mission has changed, effective immediately. Surveillance satellites have detected surface temperatures well above the norm at the South Pole. Your job will be to investigate and report back to me what you find. Is that clear?”

“Chief, I understand that my methods have earned me some unsavory assignments, but sending me to Antarctica?”

“I beg your pardon Deputy Chief, I misstated. You are not to Antarctica. You are going to the Lunar South Pole where Megalith Lunar Mining operations are based. Yes, you with a small investigative team are going to the Moon. We are responding to a request from the Space Exploration Administration. You shall investigate anomalies cited in Megalith’s monthly reports to SEA regarding preservation of water ice reservoirs and other protected resources within the lunar soil, known as regolith. Megalith has been granted sole authority to mine the regolith in Shackleton Crater, at the South Pole. As you know, the Moon possesses an array of volatiles – precious elements and compounds that Earth needs desperately. Top among them is helium-3, which is required for our burgeoning nuclear fusion industry. That being said, verified ice pockets are considered “holy water” for future colonization of the moon. We need to make sure these ice pockets are not contaminated by volatile mining operations. And we must discover the source of heat emanating from the regolith. It’s supposed to be deadly cold at the surface. Minus 200 degrees Celsius, so I’m told. Report to SEA at Cheyenne Mountain, Colorado, ASAP. Is that clear?”

Tree did not respond. Thinking only to himself, “Investigate? On the Moon? If my suspicions are on cue, I must heed the warning signs with this mission.”

“Deputy Chief, is that clear?” Carvalho barked out angrily.

“Clear as a tornado warning siren Chief. Do you really think you have made a wise choice by selecting me for this?”

“Tree you insolent oil fracker,” Carvalho retorted but held back the bile oozing up in his throat. Taking a deep breath to center himself, Carvalho lowered his tone. “Tree, you are by all standards our number one asset for discovering wrongdoing. Moreover, your record is unmatched at identifying and preventing potential cover-ups and catastrophes. That is why your

eccentric attitude is tolerated as part of your total package. We need you on this, but for God's sake be a team player, *my team player*. This could be a dangerous mission Tree. I don't want to lose you as a result of your usual risk taking insanity. You've got this one chance to bring REEL Rangers to a higher standing. Will you do this for all of us? Placing your pride aside?"

"My pride was lost years ago Chief. I lost eight Rangers in the past ten years to industrial accidents in Nigeria, Brazil and Iran. You know why, and I know better. Now, it's the Moon? As ordered, I'll investigate and advise employing my instincts, and my team. But expect more of the same from me Chief, not less, if you want this job done right."

"Tree, you truly do not have a way with words. Adding insult to injury, you also specialize in driving me stark raving mad. If anyone else were to speak to me like this, I'd take pleasure in castrating them - man or woman. Take care of yourself Tree. Take care of your team. Sophie Lavoie and Luis Ramirez will join you at Cheyenne Mountain. Now please, get the hell out of my office." Carvalho swiveled his converted barber's chair towards the window.

Without another word, Tree stood up and walked out wondering what really motivated Carvalho to choose him for this mission. Over the past decade, his far-reaching itinerary included some of the most remote and desolate areas of the planet. Now, a voyage to a frigid dark desert on the Moon awaited. What a circuitous journey for a farm boy from Georgia. His Granny Lethia would surely watch over him on this new adventure, like always.

Tree only marginally resembled his namesake in appearance. Most people mistakenly assumed that the nickname "Tree" was derived from "Tremaine," who was first called, "Trey." Granny Lethia consecrated "Tree", during his twelfth year. She was always amazed at how he would climb the tallest trees and sit for hours just watching the sky, with a strong urging.

One steamy windless summer afternoon, twelve year-old Tremaine sought refuge from the heat through his favorite past-time, a walk in the woods to his sacred grove. He loved nothing more than to bathe in the ambient shade of the forest. Strolling blissfully down his habitual path, he suddenly halted, struck by the terror of what he did not see. His beloved grove of cherrybark oak trees was obliterated - cut down to wide circular meter-high stumps. A half-acre of tall robust shade bearing trees heartlessly laid to waste. The devastation felt more like a desecration piercing his heart and soul. The felled tree trunks were nowhere in sight. Instead, an enormous yellow machine on tractor wheels dominated the landscape. This monster perpetrator had sawed down and devoured his living treasures. Across its long body, the word, "Treeminator" boldly stated its purpose.

Trembling with anger and despair, Tree approached the vehicles elevated cab section and stretched his small frame to reach up and climb the ladder, seeking the operator. Reaching the top of the ladder, he clearly saw that the cab was empty, as the vehicle's engine sat in cold silence. He feigned a half-swallow, pooled together and launched an angry wad of spit at the cab's window. Satisfied, he climbed down to the ground. Determined to confront the desecrator face to face, he located the stump of his favorite tree and sat upon its surface, crossing his legs and arms with resolve. But a short while later, Tremaine curled up on the stump like an infant, softly sobbing himself to sleep.

Meanwhile, Granny Lethia was calling upon her neighbors to keep a lookout for Tremaine. Frantic with worry, she did not wait long before alerting the authorities, later that evening. The police soon joined the neighbors searching for Tremaine well into the dark moonless night – to no avail. After sunrise on the next morning, the Treeminator crew returned

to find Tremaine sound asleep on that very same stump. The crew astutely alerted the police to this seemingly lost boy.

Granny Lethia was sitting in a rocking chair on the large front porch waiting anxiously, as she sighted a police SUV turn into her driveway. Seeing Tremaine jump out of the vehicle, her brief sense of relief was stifled by a flash of anger. A police officer also got out of the vehicle and slowly followed, allowing Tremaine to receive his welcome home.

“Trey, where in God's name were you, I was worried sick to death. Folks all over the neighborhood been looking for you.”

“Granny, they cut down my best trees. All of 'em down to the stump! They can't get away with that and the police ...”

“Hush up now boy,” Granny demanded. At that moment, the police officer stood directly behind Tremaine.

“No harm done ma'am. Some tree workers found him asleep at their work site. The boy woke up mad as a hornet. I suggest you keep him closer to home for a while. That's about all I have to say. I'll leave the rest to you. Have a nice day ma'am.” The officer briefly shot a warning glare at Tremaine as he turned to walk back to his vehicle.

“Boy, what makes you think you can just go around causing trouble like this?”

“I'm sorry Granny, but my trees! They were my trees!”

Granny Lethia slowly lifted her right hand to her heart and sat back in her porch rocking chair with a deep breath..

“I mean, Granny,” Tremaine reconsidered. “My trees, they looked out for me, but I didn't look out for them.”

“Well, I guess you have good reason, but your reasoning ain't holding no water with me boy. For now, I'll just plant you in the back yard where I can keep an eye on you, *Tree* Mays. You are grounded until I say otherwise. Now get used to hanging 'round your tree friends out back.” When folks in town inquired about his adventure that day, Granny would just say, “My Tremaine turned out to be a Tree.” So the nickname stuck to him like tree bark.

In school, Tree excelled in science and his passion for ecology was fostered by his Granddad Lee who was a veterinarian and a farmer, descendant of Georgia farmers. In fact, the land they lived on had been handed down for generations. The family knew how to take care of the land and they instilled this passion in Tree, as well. As soon as he could walk, Tremaine followed Granddad Lee around the farm all day, everyday. When he learned to talk, there were always questions and more questions, “Grandpa why don't we plant cotton this season?”

“Tremaine, we need to give the ground a rest this season by planting soybeans to help replenish nutrients in the soil. I still work the land as my grandfather did. Even in this day of technology, if we take care of the earth, it will take care of us.”

While still in secondary school, Tree was recruited by the REEL Rangers Institute to study the environmental sciences. He eventually joined the environmental corps, working around the globe. His passion fueled his dauntless determination. Tree's life became his passion, living as a forestry steward, helping to safeguard fragile ecosystems. Since childhood, Tree identified with this prime motivation, making him a fierce and formidable ecology advocate.

*Yongbyon, Korea (former Yongbyon, North Korea nuclear complex)*

Sophie Lavoie, Aerospace Engineer, eased herself down into the pilot seat of the almond-shaped air car, *Hummingbird*. Powered by electromagnetic propulsion (EMP), *Hummingbird* could ascend hundreds of meters to hover motionless while surveying in any direction. Sunlight reflecting from the metallic green body made the air car appear to shimmer and oscillate, mimicking a hummingbird in mid-air. Extending four meters from its nose cone like a long cannon was the Magnetic Current Resonator. The MCR's cylindrical module was mounted in direct line of sight from the cockpit where Sophie was positioned to operate the device. The device was the first prototype, untested in the field. Facing the control panel, Sophie lifted her helmet visor methodically to allow the retinal scan to flash a beam of light into her coral-blue eyes, instantly logging her into the *Hummingbird* operating system.

As her eyes examined the control panel her mind wandered back to her eighteenth birthday gift from her mom and dad - a snow-terrain hover-sled. Sophie had been the first teenager in Sainte-Agathe-des-Monts, Québec, to own a hover-sled, designed to fly a meter above the snow and ice terrain. Driving the hover-sled she nicknamed *Solange*, Sophie felt empowered and liberated. During that winter in Québec, she explored the Laurentian Mountains at reckless speeds, testing the limits of the vehicle, as well as her piloting skills. "Thank God my parents couldn't see me!"

The cab of the *Hummingbird* was snug all around, giving her a sensual pleasure she had not imagined since those youthful thrills in the hover-sled. The *Hummingbird* cab felt amazingly similar and she smiled to herself as she input system protocols to prepare for testing the device. This was the first field test of the Magnetic Current Resonator, which created a virtual magnetic current designed to shield against ionizing radiation leaking through storage casks. The MCR was developed to render inert the ionizing radiation emitted from high-level radioactive waste from dry storage casks produced as a byproduct of nuclear weapons production. The energy required to isolate the radiation was prohibitive. If this device could safely seal these high-level nuclear waste casks, even temporarily, the global community would breathe easier.

"Control Center to Test pilot, verify your status," Luis Ramirez alerted Sophie in her helmet radio. As acting mission leader, Luis stiffly followed protocol, even though he and Sophie shared a close friendship.

"All systems check, ready to proceed Lu... I mean Control Center," responded Sophie, eager to fire up the device.

"Test Pilot proceed to containment grid number eight and await instructions," Luis ordered.

"Roger that, Control Center," Sophie truly wanted to chuckle at Luis' official demeanor, but thought better of it. "Might as well let him enjoy this, 'cause I'm the one having all the fun," she thought. Sophie lifted off without hesitation flying the MCR in minutes to firing position forty meters above containment grid number eight where a dozen huge steel casks stood vertically on a concrete pad.

"In position and powering up MCR. Targeting the storage units. Awaiting permission to discharge the device," Sophie could barely hold herself back from blasting the target with a virtual magnetic current.

"Test pilot, discharge for ten seconds when ready," Luis commanded.

Without a verbal response, Sophie opened fire on the target for ten seconds, hearing a loud whining sound from the module without seeing any visual effect at the target. Then a momentary flash of white light emanated from the target platform below.

“Test pilot to Control Center. I saw a quick flash, then nothing. What happened?”

“Copy that test pilot. We registered a magnetic charge but not the surge of magnetic current we expected. Prepare for another dis... stand by test pilot.” Luis cut off abruptly.

“Test Pilot, terminate mission and return to base, immediately” ordered Luis.

“What did you say? Terminate? Luis what the hell is going on down there, we’re in test mode!” Sophie exclaimed.

“Sophie, we have orders to abort this mission, please comply?” Luis implored.

“Roger that, dammit. Luis your orders better be from God on high or else!” Sophie snapped.

Luis Ramirez, also steaming mad, saw his vision blur as his mounting blood pressure activated his bio-monitor alert signal. Luis paused to inhale a gradual measured breath, acutely aware of the bio-monitor, which was worn by each Ranger in the field. The fact that Division Chief Carvallo himself called with the order to abort, only intensified his bafflement. A mission of this magnitude, aborted?

Luis, a nuclear physicist for the IRRD, joined the Rangers just two years ago. In that short span he had designed and engineered the MCR, which he unofficially named *Haymaker*. Not the typical Ranger adventurer, Luis worked for three years as a scientist for the CERN, the European Organization for Nuclear Research. After submitting numerous “anonymous” suggestions on REEL Rangers Eco-Blog, Tree had tracked down the source and offered Luis an opportunity to contribute to the discussions from within. In truth he told Luis to stop wasting his time with scientists and accomplish something that doesn’t take decades to make happen.

At the age of 32 Luis ascended to Team Leader, Research & Development for IRRD and an accomplished scientist, at the top of his game. Right now his anger was peaking as he sent an urgent alert to Tree by genie-ware, the synthetic skin computer-communicator that could be adapted to any part of the body. The genie-ware could even develop its own software applications based on a cursory description of the operations requested.

“Luis, sorry bro’, I got blind-sided by Carvallo too - didn’t even know he had intervened with you and Sophie, already. I’ll make it up to you Luis. Guaranteed! As for Sophie, I’ll be wearing a titanium groin cup when she greets me in Cheyenne. Hey Luis, Human Resources is alerting me, see you there,” Tree signed off.

*Space Exploration Administration (SEA), Cheyenne Mountain, Colorado, United North American States (UNAS)*

Tree, Sophie and Luis, clad in bulky padded silver flight suits stepped into the elevator cage that would carry them ten kilometers down the Linear Accelerator Launch Tunnel to the Auriga V spacecraft. Silently, the elevator began its slow descent. Luis stood mesmerized with sheer awe and terror, peering downward, unable to see bottom of the tunnel that was dimly illuminated with a thin circular band of fluorescent green every ten meters. Clutching both hands at the metallic rim at the neck of his flight suit, Luis pulled gasping for air. Clammy and constricted, he recalled his mother's warning from only hours earlier at her home in Denver,

“Luis, do not go up there, you cannot go. It's not a place for you to go.” Yet, here he stood at the precipice of his worst nightmare, with no escape, confined to cramped quarters for days on end with no fresh air to breathe.

“Sophie, the way you described this launch, I'm not sure the word *discomforting* is appropriate. You're saying that we're basically going to be stowed on the Auriga V in containers of jelly to keep us from turning into jelly when we launch through this linear accelerator like a bat out of hell?” Luis illustrated his understanding.

“Very good description Luis. Except that when we exit the tunnel, it will actually be more like a bolt of lightning. The energy field generated by the accelerator will help to shield us from atmospheric friction, once we exit the tunnel. We'll be safe, but we'll make a hell of a light show out there,” Sophie expounded adding a bit of humor. Luis stared blankly, eyes empty of awareness.

“Luis ... Luis? You OK, dude?” questioned Tree.

“Does he look OK to you, Tree?” Sophie interjected. She then pivoted directly facing Luis, blocking Tree's view and delicately slid her firm hands inside Luis' open helmet to either side of his temples, pressing gently. “Look at me Luis, only look at me,” she insisted. Luis stared into her coral blue eyes and suddenly felt immersed in the ocean gazing out into the endless sea. The sensation of floating, yet breathing normally, comforted him like a child in a wading pool bobbing on a rubber raft. Luis relaxed his muscles and drifted into semi-wakefulness for only moments that seemed go on and on. “Luis do you see me now?” Just as suddenly, Luis found himself staring into Sophie's eyes, fully awake and at ease.

“Sophie,” Tree whispered into her ear, “How did you hypnotize him like that?”

Rolling her eyes sharply at Tree, as a warning. She spoke directly at Luis, “All I did was help you push your anxiety from the foreground to the background, Luis. It's still there, but you won't be able to focus on it for a while. I gave you a kind of psychological sedative.”

“Cool. Whatever that was, Sophie, save some for later. I just might need it up there,” Luis added.

Tree could not resist the urge to tease, “Yeah Sophie, save me some of that *talk, touch and eye-taser technique*, just in case I start shaking in *my* boots.” In response, Sophie delivered a hard right elbow directly back to Tree's solar plexus, doubling him over.

Within ten minutes, they reached the crew cabin of the single-stage-to-orbit launch vehicle as the mission control voice chimed within their helmet speakers, “T-minus 30 minutes and counting. All systems check. Prepare to launch. All systems go.”

## Part II

### *Megalith Lunar Mining Station - Delta Base, Shackleton Crater, South Pole-Aitken Basin*

Captain Revelin North, COO of Megalith Lunar Mining, was smiling to himself again. He had a morbid habit of reassuring himself with a self-satisfying smirk when facing a potential threat. This time it was the imminent arrival of the SEA transport ferrying the REEL Rangers observers, sent to interfere with his mining operations. Revelin would make them regret making this visit.

“Captain North, please prepare for cool down stage in 5-4-3-2-1...” chimed the alto-toned computer voice ---- the Earth-gravity exercise chamber. Drenched in rancid sweat and coughing up mucous, Revelin grasped the side rails of the hamster wheel treadmill as it slowed to a crawl. His muscles ached under the simulated Earth gravity of the chamber where he, like every other staff, spent an hour each day. Knowing full well that this mandatory exercise would not fully counteract the muscle atrophy of low gravity life on the Moon, he was resigned to it. In six months, if all goes well, he would return to Earth on permanent disability, but quite wealthy indeed.

Exiting the chamber in low gravity and pulling on the handrails, Revelin easily propelled himself through the tunnel corridor towards the Delta Base Observation Deck. Delta base was forged into the upper Western wall, near the rim of the immense Shackleton Crater in the South Pole-Aitken Basin. Partially shielded from meteor showers and direct sunlight, Delta Base was ideally situated to receive shipments from lunar orbit and monitor mining operations on the floor of the crater, four dark kilometers below.

In permanent shadow from the sun, Shackleton Crater was bathed in darkness, yet teemed with activity. Across its 21 kilometer span lay hundreds of cones spaced in a hexagon formation. Each right circular cone stood 30 to 40 meters high and operated a volatile mine. Each mine-cone contained a robotic “proboscis” coil snaking hundreds of meters below the surface in a logarithmic spiral burrowing for pockets and veins of specific volatiles. Like a voracious honey-bee feeding and sucking through its tongue for the more precious volatiles, hydrogen, argon, and principally, helium-3. During the past decade, Earth nurtured a voracious appetite for helium-3, the primary fuel for nuclear fusion reactors. Megalith Lunar Mining controlled the supply which spoon-fed Earth's cities and industries.

Easing himself into the spacious recliner-style command chair facing the holo-view holographic monitor spanning the width and height of the stark observation deck. Revelin paused at his reflection in window mode before powering up the holo-view. Focusing his eyes for a moment on his face, Revelin glared at his deep-set eyes darkened even more by lack of sleep. His widow's peak had turned a dingy gray in the past year while seeming to slope further down his steep forehead. *What a torment to be relegated to this remote post where I can age so disgracefully.*

On some days, the command chair offered psychological comfort as it often lulled him into a day-dream about his better days as a naval combat ship Chief Engineer. Today, however, was not one of those days.

*Now to the matter at hand.* Powering up the holo-view by voice command, he signaled the volatile harvesting vessel operating deep within the crater, “Bumblebee Harvester, this is Delta Base, report.”

“Bumblebee Harvester to Delta Base, Chief Engineer Dawes reporting.” Dawes appeared agitated as perspiration beaded on his pallid and bloated face. The dim ambient lighting in the control cabin gave Dawes a ghostly glimmer. “Captain North, mining zone integrity continues to deteriorate at an accelerating rate. Recovery and processing of volatiles from the regolith is at maximum, per your orders, sir. However, contamination from the REGEER reagent is increasing exponentially, further compromising the regolith, raising surface temperatures and threatening lunar ice reserves.”

“Copy that. Step up recovery and processing and inform me of any further developments. That will be all Chief Engineer Dawes.”

“Beg your pardon, Captain North. As I reported, we are already operating at maximum capacity, sir.”

“Damn you Dawes, we're about to interrupt operations in six hours when the Rangers arrive to inspect our operations. We'll fall way behind on quota and commission. While I figure out how to manage this... this quagmire, your job is to speed up production. Now dig deeper and dig harder, Dawes!”

“Roger that, Captain.”

Revelin scowled at the multi-view as Dawes' image faded. “REGEEER be damned,” he cursed to himself. Revelin was never in favor of using reagents to optimize recovery of precious minerals from the lunar surface. The risk was not worth the reward. Now, Megalith Mining was forcing his hand with this experimental Regolith Element Extraction Reagent, REGEEER. His orders from the board of directors were to “deal with the Rangers and get back on schedule ASAP with shipments to Earth.”

Sixty hours after leaving Earth, the Auriga V spacecraft docked with the Lunar Orbital Command in order to transport its passengers and equipment to the cargo-pod shuttle. Tree, Luis and Sophie strode slowly up the wide ramp to the cargo-pod gate fully encased in arctic white spacesuits.

“All aboard REEL Rangers. You may remove your helmets upon entering. There's air to breathe inside the vessel,” chimed an ambient female alto-toned voice. “I am Vera, your operating system, fully enhanced to service this special mission. Your equipment has already been transferred on board and your workstations have been installed as specified. Behold.” Suddenly, an ovoid door seemed to sketch itself in the wall ahead and just as quickly swished open to reveal a stark white chamber with numerous hexagon panels forming its interior in the semblance of a sphere. The focal point of the chamber was a hexagon platform supporting three workstations facing each other in a triangle with a holo-view at its center. The trio entered the chamber led by Tree.

Tree propelled himself through the portal, enjoying the light on his feet effect of low gravity. “Welcome lady and gent, welcome to our fabulous lunar quarters for the next five days,” he presented gliding his arm skyward and bowing forward like a circus master of ceremonies.

As if on cue, Sophie took one bouncing step past Tree eyes wide open and curious. “Oh yeah? Where's the head in this... Hey better yet, where's the damn pilot?”

“Ranger Sophie, I am a Class A cargo-pod pilot with over seventy hours of flight-time logged into my system,” chimed Vera.

“So you're the damn pilot! Should've known” Sophie laughed. “Luis what do we do if the system goes down?” Luis had silently found his way to his workstation and was already fiddling with the holographic system interface, mesmerized by the technology. “Luis, are you there or trippin' somewhere again?”

“I hear you loud and much too loud and clear, like always. And besides that *Sophia*, this ain't the type of system that could possibly crash. Check this out Tree. There are modules in this pod behind those wall panels for just about everything... chem lab, supplies, lavatory, showers, food dispensers, medical, emergency evacuation, whoa! Emergency E vac?” Luis felt his lungs spasm for air at the thought.

Tree alerted Sophie, “Hey get over here I think he's ...”

“OK. I'm OK. Just nervous about being out here” Luis said delicately.

“It's alright little Louie, Mama Sophie got your back” she offered with a glance and a giggle.

“Guys, it's time to get down to that crater mine so we can rattle their chains and get back to our real work. Vera you're in charge ‘til we dock at the station.” Tree declared.

“Roger that Deputy Chief. Strap in REEL Rangers. We're swooping down into deep dark Shackleton Crater at South Pole-Aitken Basin.”

The Rangers silently searched each other's eyes for recognition of this bit of humor coming from Vera. No one found it funny. Especially not Tree, whose eyelids began to quiver. “Here we go. Somewhere down there is a threat to us,” Tree thought to himself.

Vera released the cargo-pod from its dock on the orbital station with no sound or apparent movement.

After several minutes had passed, Sophie chimed in. “So Vera, we're ready to launch anytime now, unless you need a co-pilot.”

“No need Ranger Sophie, we launched six minutes ago. You can watch our progress on the holo-view or experience our flight in virtual space mode. Which would you prefer?”

“Luis it's up to you. Ready for the really real, free-fall effect?” Sophie teased.

“I can always just close my eyes or maybe just vomit in zero gravity with puke floating all around us. Are you ready for that *Sophia*?” Luis retorted.

“For Francis' sake guys, let's behave like we work as a team, at least until our return trip. Vera let's go virtual mode please.” Tree ordered.

“Copy that Ranger Tree,” Vera responded. In an instant the interior of the pod faded to pitch blackness. Gradually ambient light appeared as the southern hemisphere of the moon phased into focus. The effect was dizzying and disorienting as the rugged cratered lunar landscape loomed closer from their near-side approach. Even Sophie tensely gripped her chair's harness straps having no sensation of being seated inside of the cargo-pod. Nothing inside the pod was visible, only the alien terrain edging ever closer in shifting shades of brown and gray craters within craters and a horizon of strangely green massif-like mountain ranges.

“Alright enough of this already.” Luis pivoted his chair to a rear view and could thankfully see the distant blue-white swirls and striations of a three-quarter sphere Earth, like a giant marble in the starry background of space. “Hey look at this view. Would love to click my heels right now and chant, “There's no place like home.”

“Amen to that brother,” Tree tagged on.

“Attention REEL Rangers, five minutes to landing at Delta Base, Shackleton Crater. Upon docking this vessel will reconvert to fully functional working and sleeping quarters. You can see the mountain range above the crater coming over the horizon now.” Within minutes they could see the sunlit jagged-edged rim of Shackleton crater and the blackness below.

“Looks like a black sea. Hard to gauge the size of it from this perspective. How big is that crater anyway?” Tree asked to no one in particular.

“Twenty-one dark kilometers across and four clicks deep,” Luis answered gloomily. “And cold as ice from hell with a temperature approaching 90 degrees Kelvin, that approximately minus 180 degrees centigrade to you laymen.”

“Hey Sophie that's more like your native weather than ours. You should feel at right home down there,” Tree jested.

“Up yours Tree, no pun intended,” Sophie countered.

“Attention Rangers, please attach your helmets as protocol requires and prepare to dock at Delta Base.”

Revelin North strode down the long alabaster corridor towards the cargo dock accompanied by his two muscular and grisly-looking technicians, Hawthorne and Krasnov. Krasnov wore a shaved scalp and a dark shadow beard that could not detract from his Neanderthal-like facial features dominated by a bulbous nose. Hawthorne, a head taller than Krasnov, wore a high and tight blond haircut that accented his beak nose and deep-set hollow eyes. The trio was clad in the black thermal undergarments meant only to be worn under the miner work-suits. The undergarments had the look of sculpted and padded body armor. North's sole intent was to intimidate the arriving visitors as dramatically as possible upon their very first encounter.

As the airlock to the cargo-pod opened, Tree was the first to emerge unlatching his helmet as he walked down the short ramp to face North, eye to eye. Tree glared shamelessly into the hawkish eyes of Revelin North, ignoring the technicians altogether. Recognizing the attempt to intimidate, Tree thought to himself, “So this is it ... the source of my premonition!”

North standing erect with fists at his hips and yielding several inches to Tree, directed his angst towards the tall leader of the pack, “Welcome to Delta Base, Ranger Mays is it?”

“Deputy Chief Tremain Mays,” he corrected. “And these are my REEL Ranger associates, Dr. Sophie Lavoie, Aerospace Engineer and Dr. Luis Ramirez, Nuclear Physicist.”

“Welcome aboard. Now if you will follow us to the observation deck where you will conduct your investigation,” North commanded as he motioned to his technicians to lead the group down the corridor.

“Just a moment Captain North,” Tree interjected. “After flying the better part of 400,000 klicks, we're still 4 klicks short of our destination. Our orders from the SEA allow for on-site investigation of the mining zone. That means ...”

“I know what that means Deputy Chief,” North, intolerant and impatient under normal conditions, felt as exposed as if he were naked on the lunar surface. His survival instinct was not hinged on self-preservation but motivated by eradication of any threat to his survival. Now, coerced to relinquish his feigned hospitality for the safety of his own morbid mental comfort zone, North devised the way forward. “Indeed, you shall have access to the mining zone, but *only you*, Deputy Chief. The only way to dock with the volatile harvester is by surveyor-skiff. It only seats two, and we only have one available. I will pilot us down to *Bumblebee*. Your associates will monitor from the observation deck. Is that clear Deputy Chief.”

“Clear Captain North, clear as a tornado warning siren.” Tree's answer was a coded message to his Ranger comrades to take extreme caution and prepare to improvise should a hazardous situation unfold.

Looking to Sophie at his left and Luis to his right, Tree appended his coded message, “You heard the Captain. You guys have a bird's eye view of the situation.” Code for watch like a hawk and be prepared to act swiftly.

“As ordered Deputy Chief,” Sophie mused, “I've been missing out on all the fun lately. No fair!”

“Actually, I had enough of an adventure just getting here, thank you very much.” Luis shot a warning glance at Sophie.

In the docking bay, Tree and North stood together at the pair of airlocks stationed just below their feet. Tree stared down through the transparent airlock to the compact rear cockpit of the surveyor-skiff, a back-to-back two-seat flying vehicle. The compartment appeared too small to accommodate Tree's large frame. Already, he regretted challenging North without any hesitation or forethought. But the man was unnerving to look at. Moreover, reasoning with North did not seem like an appealing option.

“Your attention, Deputy Chief. When I open your airlock, just plop yourself down into the seat. You’ll land softly in low gee. After that, allow the life support harness to gently attach and contour itself to your body. It’s a customizing feature that will fit you like a glove, head and torso,” North explained concisely. Tree perched on his tip-toes to lift himself up over the center of the opening hatch and softly landed buttocks first on the seat that seemed larger than it appeared from above. Stretching out his long legs seemed to activate the life support harness now snaking from behind the seat to gauge his dimensions. Crossing diagonally across his chest from lower left to upper right and lower right to upper left through a saucer-size red disk that served as a buckle and monitor, joining in symbiosis with his flight suit.

Just moments later, the two prepared for launch seated back-to-back in the narrow vessel with North in the forward facing pilot’s compartment. In total silence and without the sensation of motion, the skiff eased out from the ambient light of the dock near the rim of the crater wall. Tree shuddered watching the dock portal iris-out of sight. Peering skyward towards the jagged crater rim close above, Tree glimpsed an outline of sunlight brushing the uneven precipice above Delta Base, where sunshine bathed the cliffs surrounding Shackleton Crater. Under the observation deck's translucent dome, Sophie and Luis could feel daylight and see starlight, while he embarked into absolute blackness.

The skiff itself emitted no headlights whatsoever. The feeling of sensory deprivation was numbing. Tree could not even feel the self-awareness of normal breathing. Thoughts drifting, Tree imagined himself, fully grown within a womb still attached to an umbilical cord. But the womb was not that of his mother. Then just as the anxiety threatened to overwhelm him, the skiff abruptly spun 180 degrees, placing him in the forward, and accelerating into a nosedive. Then, impossibly, the landscape exploded with illumination. The skiff seemed to careen down the brightly lit crimson-red crater wall at a thirty degree slope into the crater abyss. The light emanated from the pocked and pitted surface as the skiff flitted scant meters from the crater wall, dodging sharp outcroppings randomly spread down the steep descent.

Instinctively, Tree reached up with both hands to grab hold of the upper straps of his harness to brace himself, not against gravity, but fear of impact. Somehow the skiff had pivoted placing him in the forward position heading downward. But, he had no control of the vehicle. He was flying into a red-hued wind streaking by in his peripheral vision. Abruptly, the skiff began spinning clockwise, along its long symmetry axis, spinning Tree to his right, head pressed to the cockpit window, further disorienting its unwelcome passenger.

Gradually, the skiff’s oriented itself with Tree in the rear-facing position as the nosedive decelerated perceptibly. As the declination eased, becoming less steep, the crimson-red surface shifted to a sunset orange landscape dotted with baseball to beach ball-sized impacts. Tree gazed out across the alien surface feeling isolated and exposed. Abruptly, the skiff stopped at the edge of a cliff overlooking a range of hills hundreds of meters across. An undulating band of aqua-blue light eerily adorned the hilltops, alternating to sea-green and back to aqua-blue, like ocean wind waves. Unaffected by the wavelike motion, the skiff eased forward towards the hilltops. At

this moment, Tree attempted to gauge its height peering across the indigo blue chasm below. The bottom was not visible. Looking up into starlit space, Tree felt adrift in outer space.

Lurching downward, the skiff homed in on its unseen destination toward the crater floor. As the skiff descended, the cartoon-like landscape was diffuse with ambient indigo-purple light that negated any view of the myriad stars seen moments ago.

“Almost there, Deputy Chief. Gave you the scenic view. What do you think of our moonscape?”

“Thought I had died and gone to hell. The scenic view?”

“Thanks to navigation via holographic mapping mode. *Holo-nav* we call it. With no real daylight down here, we use our surveyor-skiff to continuously map the 400-plus square kilometers of Shackleton Crater. That means most every rock and nook and cranny. All in spectacularly color coded topography. It’s the only way we can operate in this abyss.”

“Well, Captain North, I am duly impressed and amazed. Cannot say that I enjoyed the ride, but I’m sure you enjoyed my distress along the way.”

North smiled to himself thinking, “Ooh, that was just a taste of what’s to come my Deputy Chief!”

“*SS-1 to Bumblebee*, we are approaching mine-cone 11, sector G for a close-up inspection before proceeding to your dock. Make room for two, Chief Engineer.”

“Roger that *SS-1*. Making ready accommodations for two,” replied Chief Engineer Dawes. Two additional crew would strain the environmental systems of *Bumblebee* at a crucial time. “Why did the Captain allow this untimely visit?” Dawes wondered.

“Alright Deputy Chief, from here on out pay close attention. I’m providing you with a crash course in volatile mining, and there will be a pop quiz afterwards.”

The skiff drifted in a slow, steady descent to the surface illuminated by indigo to deep purple hues emanating from the uneven rocky desert of regolith. Tree refocused his eyes, adjusting to the nearly monochrome terrain. He knew that the canopy cover was transparent, but it helped him to relax by imagining that he was looking through a tinted glass windshield. Upon closer inspection, the regolith surface just below the skiff began to shimmer a soft translucent silver-white. The skiff continued so close to the ground that it could have been rolling on tank treads. His view orientation flashed to a new scene sharing the same forward real-time view as North. In the near distance, sparkling copper cone-shaped structure appeared as their destination.

The cone stood several stories high with a circumference as wide as a large grain silo at its base. Hovering atop the mine-cone, loomed the volatile harvester, *Bumblebee*. True to its namesake, the vessel consisted of a brilliant metallic yellow exoskeleton with dark brown contours separating the head, thorax and abdomen. As wide as a wide-body aircraft, but modeled on bumblebee anatomy, the wingless harvester hovered sustained by three pairs of “legs” that functioned as thrusters, enabling its bee-like mobility. *Bumblebee* suctioned volatiles by extending its long proboscis-like tongue appendage through an orifice at the apex of the mine-cone structure. The skiff approached and circled the wide base of the mine-cone that vibrated with earth tremor force while emitting a steady low-pitched humming sound.

“I can hear it. How is that Captain? Does sound travels in this near vacuum?”

“Not so much. It’s not your hearing, Deputy Chief. You are feeling surface vibrations from the mine. The mine-cone uses a drilling coil to forage deep into the regolith in a logarithmic spiral. That spiraling coil extends outward and downward for hundreds of meters. It does this by

heating and grinding the rocky regolith voraciously, while sending precious volatiles back through interior tubes to the mine-cone on the surface. The harvester then extracts the volatiles through a proboscis tube and transfers the volatiles to the processing area in the abdomen of *Bumblebee*. A fascinating operation, and we're damn proud of our work down here!"

"Okay Captain, sounds amazing, so why I am I here? To pat you on the butt or what?"

"You are here, unfortunately, to observe the effects of our mining operation on the crater floor. I'm sure you noted the silvery glow on the surface. That glow is a sign of heat generated by all the activity underground. If there are any water ice pockets down there, I'm certain they have all succumbed to the heat and pressure by now. But that's the price of progress, Deputy Chief. Please extend our apologies to the Space Exploration Administration."

"You know Captain North, if you were running an operation like this back home, I'd shut you down in a heartbeat. Now can we get on board that overgrown flying insect? I want to find out exactly what I'm going to report back to SEA."

"Well, well, well, you *are* living up to your stellar reputation Deputy Chief. SS-1 to *Bumblebee*, prepare Dock A for boarding."

"Aye, Captain," Dawes answered.

On the Delta Base observation deck, the scene resembled a late-night poker game. Sophie, Hawthorne, Luis and Krasnov sat stoically around the holo-view table staring intensely at the surveyor-skiff's flight progress projected in color-coded topography. The skiff transmitted all on-board communications as a matter of protocol. The foursome heard every word spoken, every breath taken. The tension among the four observers escalated as they winced at each excruciating exchange between Tree and North. Hawthorne and Krasnov shared a sneaky grin at North's last barb before docking with *Bumblebee*. Luis and Sophie glared ominously at each other, acknowledging the deteriorating situation.

"Sophie, take a closer look at that silvery glow North described as heat from friction generated by drilling below the surface," Luis prompted. "It actually behaves more like radiating heat from a chemical reaction."

"Could very well be," Sophie agreed, "but how are we going to confirm anything while we're stuck way up here?"

"Stuck way up here?" Luis echoed. The thought of leaving this cozy setting was out of the question.

"As Captain North indicated, the drilling process generates enormous friction," Hawthorne quickly chimed in.

Just as quickly, alarm bells started ringing in Luis' head. "Hawthorne, I'm curious about the volatile refining process. How exactly are the chemical elements and compounds separated?"

"The refinery on board the harvester handles that process, which entails separating the volatiles," Hawthorne answered. "Technically, it's not a refinery, we only pre-process the chemicals for shipping back to Earth."

"So, can you tell me exactly how the volatiles are separated?" Luis rephrased.

"No we cannot," Krasnov blurted out. "That's proprietary information beyond our authority to divulge to anyone. The two of you need to understand, we do not entertain visitors here on Delta Base, and therefore ..."

"I understand completely, Krasnov," assured Sophie, while making friendly eye contact as she reached out to lightly touch the top of his right hand with her left. "Our intrusion must be

quite annoying to you all. Please accept my apology, won't you?" Still maintaining her penetrating azure-blue beckoning gaze, Sophie perceived an opportunity to engage her conversational hypnosis with Krasnov. "Better yet, now that the surveyor-skiff has docked with *Bumblebee*, wouldn't this be a good time to test a sample of the volatiles stored on Delta Base?"

Suddenly disarmed from his earlier defensive posture, Krasnov spoke in a more conciliatory tone. "Well, yes and of course, it's just down ... uh, please, just follow me, Sophie." Krasnov stood up smiling gently at Sophie and walked towards the exit, without a word to Hawthorne or Luis.

"That was fast. Never seen him go all sweet and nice like that," Hawthorne observed. "Then again, if I had the chance to entertain her for a while," he added jokingly.

"Sophie has a particular way of diffusing a tense situation, except for when she's really pissed off. Then she rips off the gloves." Luis realized that Sophie decided to employ her special talent which Tree now referred to as her *talk, touch and eye-taser technique*. Getting Krasnov off the observation deck would allow Luis to more freely investigate the heat source in the crater.

"Looks like North has gone offline upon docking. We'll hear from them again once they get settled on the bridge," Hawthorne informed Luis.

"Perfect. Those two definitely do not need to be alone together a second longer," Luis pointed out. "Now, according to the Captain's log, *Bumblebee* is extracting six to eight metric tons of regolith per day with a yield of less than 50 kilograms in precious volatiles. How does it sift through all that dirt?"

Hawthorne stared blankly for a moment before responding. "Well, there is a kind of reagent we use called REGEER, an acronym for Regolith Element Extraction Reagent. It can separate out helium-3, hydrogen, titanium, and other elements in a matter of minutes."

"You guys are doing some fascinating work," Luis asserted. "Do you think you can show me a holographic of how the REGEER works?"

Sophie and Krasnov stood in the quality control lab perched across from each other over a small round table covered with a transparent dome. Under the dome, a silver-orange cloud of helium-3 dust circulated in a random ebb and flow motion. The two continued their conversation as Sophie maintained periodic eye contact to keep Krasnov focused on her intent. Gently placing her hands on either side of the dome, she hoped to sense some vibration or heat from the contents. She felt nothing at all, but was not deterred.

"Krasnov, I can feel that dust flying around in there. Hey, did it just change color? Looks more reddish now." Sophie leaned her head down for a closer look. Curiously, Krasnov also leaned closer to the table. As if on cue, Sophie let her arms lift to lay her fingertips on Krasnov's temples. Instead of pulling away reflexively, he joined in eye-contact, transfixed on Sophie's coral blue eye's. Fully engaging Krasnov's consciousness, she proceeded with her interrogation.

"So, Krasnov, please tell me what's the big hush-hush about what goes on down there? I still don't get why we were sent all the way here when there are clearly other ways to observe."

"The thing is, Sophie, Captain North is taking heat from corporate to increase production quotas before we have to pull out of here."

"Pull out? Why would you need to abandon a profitable mining operation," Sophie inquired.

"It's the REGEER. It's not just used aboard *Bumblebee*. It's used in the mine-cones and it's out of control."

“Out of control? How so Krasnov?”

“The REGEER ... We call it a reagent but it’s really nanotechnology, self-regenerating. And it’s contaminating the regolith somehow.”

“Contaminating?” Sophie exclaimed nearly disengaging her conversational hypnotic control. “Tree will go berserk when he finds out.”

“Tree probably won’t find out cause North has other plans for him. An accident or something.” Sophie nearly lost her composure with that revelation. Time to wrap this up, she thought.

“Krasnov, you’ve had very long day today. You look totally exhausted. Just rest here for a while. Take a nap if you can. I’ll head back to the observation deck on my own,” Sophie advised and Krasnov complied.

Sophie leaped through the cargo portal, propelling herself through low gravity with hand grips lining the corridor to their cargo pod. Moving with alacrity, heart racing and sweat lacing her short blond hair, Sophie jumped through the cargo pod hatch shouting, “Vera boot up, we’ve got work to do.”

“Acknowledged Ranger Sophie, how can I assist?” Answered Vera in her always pleasant voice.

“Tree’s in trouble on *Bumblebee*. I need to get down there, ASAP!”

“Ranger Sophie, I am not able to pilot to the mining zone without authorization and access to Delta Base’s holographic navigation system,” Vera warned.

“Don’t need you for that Vera. I got my hovercraft *Hummingbird* retrofitted for lunar excursions. Just need you to open the outer panel. Now show me the access panel so I can board her,” Sophie snapped.

“Ranger Sophie, I advise against your action. Without the holo-nav you will be flying in the dark. Furthermore, what action would you take upon arrival. I will notify Lunar Orbital Command of our situation ...”

“Vera, we don’t have time for this. Luis will get me access to the holo-nav, somehow.”

Revelin North clearly sensed the futility in taking his frustrations out on Tree Mays. It was sickening to be faced with the untenable circumstance of contaminating the Indigo Valley mining zone and pulling out in order to repeat the process in another pristine area of the South Pole. However, North desperately needed to relieve some of the tension percolating inside his thin skin. Besides, Tree Mays was certainly performing his best act of provocation. North was compelled to oblige him. *Consequences be damned!*

Piloting the skiff into position under *Bumblebee*’s mid-section, Dock A was clearly outlined in glaring white light, as its oval portal opened. North effortlessly guided the skiff up into the dock. Checking each indicator on the control panel, North intended to power down the surveyor-skiff’s operating system, according to protocol.

“If you’re going to do it, do it now!” commanded a cynical voice from North’s devious mind. Responding with a slow but deliberate series of motions, North shut down the life support system in the adjoining co-pilot cockpit and programmed the surveyor-skiff’s auto-pilot to cast off from the dock. North then set the flight pattern to land in Raven’s Gorge two kilometers outside of the mining zone.

“Give me a moment, Deputy Chief, and I’ll have you on your way out of here so that you can conduct your final investigation ... solo,” North assured, smiling to himself. “It appears that your sterling reputation for insubordination and rogue behavior has finally caught up with you.”

“What the hell? North, what are you up to?” Tree demanded taken aback by the implied threat. Then watching his compartment control console blink out, “My air supply! You son 'a bitch. Open the damn hatch. You can’t get away with this!” Tree began gasping for breathable air.

“No Deputy Chief, *you* can’t get away. Apparently you weren’t satisfied with my story so you attempted to commandeer the surveyor-skiff in order to conduct your own ego-driven investigation of the mining zone. The record will show that upon docking, I opened your canopy and mine, ordering you to climb into the personal airlock now connected above your seat, as I did. Obviously, this was the opportunity you sought in order to gain control of the skiff, seal each canopy and quickly exit *Bumblebee* before Dawes could override your pirating of the skiff. Sadly, you thought you were competent enough to pilot the skiff on your own without consequence or risk to your safety. How pathetic? Seeing yourself as some type of pseudo-hero? Well, you’re going to die hard my friend, die very hard indeed,” North chuckled.

“North, when I get out of here I’m going to stuff regolith up your ass until I bury you alive from the inside out,” Tree blurted still heaving, punching the controls to no avail.

“Good luck with that. Now before I send you into the Raven's Gorge abyss with no life support and no radio contact, please press the red button in the mid-chest portion of your flight suit. This is your emergency air supply. It will last, oh, maybe twenty to thirty minutes max, if you breathe ever so gently. I need you alive just that much longer to corroborate my story. I promise we’ll recover your remains in an hour or so. You’re on auto-pilot now and *incommunicado*. Not-so good knowing you, Deputy Chief.”

Obstinate, stubborn, headstrong, relentless, defiant. Appropriate descriptive words that applied to Tree's character. In this dire circumstance, these traits could help keep him alive long enough for rescue to arrive. Holding his breath at first, Tree tried counting down from 100. Stopping at 75, the freezing cold distracted him too much to continue. “Blast you North. You could have kept the heat on – and the holo-nav. This is unbearable frigid blackness.” Thoughts were running rampant, revving up his anxiety. “Gotta focus on something ... or maybe daydream. Yes.”

The skiff continued on its silent predetermined flight path without visual display for its hostage-passenger. Tree attempted to calm himself and slow his breathing and heart rate by daydreaming. His daydream began at Delta Base. Launching the skiff into the crater, not as it happened, but how he wished it had transpired.

“The dock portal irises open and I see daylight outside. The surveyor-skiff is easing out of the dock near the rim of the crater wall. I am stunned by the crimson-red burst of color emanating from the upper edge of the crater wall circling the entire circumference. My eyes are overwhelmed by the brightness, yet they are gradually adjusting to the sensation of infrared radiance. Looking downwards from this staggering height, I see the great expanse of the crater wall sloping inward in hues transcending from red to sunset orange from the upper heights to golden-yellow descending below. From this height, I cannot see the bottom of the crater. It's too far down.

Holding steady at this level, just outside the surveyor-skiff dock, I look across the great expanse. I imagine the Grand Canyon, which I have never visited, but have only seen in movies. But this scene is far more alien than the Grand Canyon. My mind shifts to imagine the inner rim of a simmering volcano. The comparison is not true to scale. No volcano on earth is this immense – twenty kilometers across, yet I can see the glow of a thin red line of the rim clear across the crater. No place on Earth compares to this.

This vessel I'm flying in was designed to map the eternal night of Shackleton Crater in all its bizarre mind-bending beauty and display super-detailed holographic images on the canopy window of the surveyor-skiff. All this, in order to simulate and facilitate holographic navigation in real-time, in contrast to the actual perpetual darkness that I now traverse. They call it “holo-nav.” Holo-nav is giving me a breathtaking view even more-so because there is no air out there to breathe. It is all the more surreal or unreal. I think it is both.

The skiff is moving counter clock-wise tracing the inner circumference of the crater, descending slowly. I say slowly because I can see the narrow vertical crevices in the wall nearest to me. I want to call it the face of a mountain because that is how it appears at this stage. I am reaching for topographic comparisons that do not even come close to what I am experiencing. The crevices are many narrow vertical rows or ridges interrupted by pockmarks and pits from countless meteorites of assorted sizes.

We're picking up speed from what I can see, traveling the circumference downwards. With no sensation of gravity, I can only judge our velocity by the crater wall-face featuring blurring by as we fly. For the first time, I glance down to the console altimeter – minus 1.2 kilometers. Still over three clicks to go before we reach the crater floor. Still tracing the wall-face, the ridges appear thicker with deeper crevices between – and fewer impacts from meteorites. The color now is also shifting from golden-yellow to lemon-yellow – minus 1.8 clicks. My eyes readjust to the intense brightness. Maybe, I'm wrong. It could be the holo-nav adjusting its resolution to accommodate my vision. I'll check into that later.

Looking out across the crater, I now see a glow-stick green luminescence in the distance below. It's a peak of some sort. Checking the console, the crater floor topography comes into view with legend and labels. “Green Mountain” it says – altitude is minus 2.5 clicks. No positive numbers are shown down here, everything is measured as a negative number. Like what you would imagine in Hell. What the hell am “I” doing here?

It's a rounded peak, and wide, dominating the horizon from this stage. The word “horizon” feels inappropriate. This place requires its own unique vocabulary. The best I can do is apply descriptive words that still fall short of conveying what I see and experience, virtually. It's like a holo-game, except for the undeniable fact that I'm really here at the rotational axis at the South Pole of the blasted Moon. I still can't believe it!

Alright, I can now see the crater floor. Except that it's a terrain, not a flat floor. Shades of lighter blue for the “hills?” I also see valleys and gorges ranging from indigo to deep purple. We are rounding from the wall-face towards Green Mountain, which is more like a mound than a mountain, with a small valley between the crater wall. The dimensions of the crater bottom are smaller than I imagined due to the inward slope of the crater wall. It's only about seven kilometers wall-to-wall from here, at minus 2.7 clicks.

Here we go! Aiming back towards the center and downwards to the floor, we pass a range of blue hills that seem to partition the crater floor into halves. In fact, “Blue Ridge Hills” is now flashing on my console. In a steady descent, I can make out significant craters in the valley

to the East. East? Really? That's the label my console monitor displays. Wow! This scene is eerie as we drift down into a wide mini-crater, at least a hundred meters in diameter, colored in dark purple, but still bright enough to see in great detail. Clusters of boulders and various fissures around the center of this mini-crater. Approaching near a wide fissure at the very bottom, it is pitch black and shifting. The blackness seems to emerge from the depths of the chasm, as though it is crawling out to overtake the surface areas like an escaping demon. Raven's Gorge!"

Aboard the cargo-pod, Vera opened the hexagon panel to the section of the cargo hold storing *Hummingbird*. In awe of her shiny metallic green beauty, Sophie leaped in low gravity, arms forward, fully extending herself to reach her treasured hovercraft.

"Ranger Sophie, I have just received an alert from Ranger Tree's bio-monitor. His respiration and heart rate are in distress," Vera stated emphatically in a higher pitched voice conveying a human sense of urgency.

"My God, are we too late? Hey, you're getting signals from Tree's bio-monitor?"

"Affirmative. Ranger Tree is still breathing but experiencing severe anxiety, mentally and physically. Bio-monitors were originally installed in each of your flight suits. I am receiving telemetry data from Ranger Tree's bio-monitor. He is traveling away from the volatile harvester."

"That's not right. Tree should be on board *Bumblebee*. Vera can you guide me to him?"

"Negative, Ranger Sophie. I can tell you where he is located. I cannot tell you how to arrive at his location without the aid of the holo-nav," Sophie asserted. "The terrain below is precarious. You will traverse craters within craters, while circumventing massive rock outcroppings upon reaching the crater floor. And what will you do when you find him?"

"Enough Vera! Just point me in the right direction. Luis will come to my rescue. He owes me one," she mused. Sophie strapped herself into the modified cockpit preparing to power up the aircraft now transformed into a lunar spacecraft. She winced as the retinal scan flashed a beam of light into her eyes, logging her into the *Hummingbird* operating system. Verifying propulsion and life support systems, Sophie girded herself for the leap of faith she needed to fly blindly into the pitch black crater with headlights that would dissipate in the absolute darkness below. "OK Vera, close the interior access panel. I am closing the canopy. Maintain radio contact and telemetry for Tree as a homing beacon for *Hummingbird*. Come on Luis. Don't let me down this time!"

"Affirmative Ranger Sophie. Opening outer panel in 5-4-3-2-1."

The atmosphere on the observation deck had become much more relaxed after Sophie and Krasnov took their leave. In their limited time working together, Hawthorne and Luis explored each other's intellectual curiosity. As a consequence, Hawthorne invited Luis to examine the REGEER processing and share his critique of the conundrum. In mutual respect, the two endeavored to work as a team. Hawthorne started the holo-view animation program.

A circular copper-hued disk materialized on the surface below, with a circumference as large as the dome of an underground missile silo, glistening and undulating with inner activity. The disk was composed of countless circular coils teeming with intelligent synthetic energy. Underneath the disk, the regolith surface adhered to it like static electricity. Sensing the regolith, the disk extended a single coil from its center snaking downward in a logarithmic spiral. White

hot, this leading strand represented the initial probe burning through the dingy brown sand, testing the composition of the top layers.

Spiraling downwards several more meters, the leading strand detected concentrations of hydrogen and signaled for the hydrogen collector coil to descend in a mimicking outward spiral from the core of the disk. The hydrogen collector coil greedily absorbed every trace of hydrogen, transporting the element upwards to the disk on the surface. The probe coil continued foraging until it discovered a vein of helium-3. Instantly, the helium-3 collector coil disengaged from the disk in a steep logarithmic spiral, eager to pillage the mother lode. Within minutes, regolith bearing this precious element began surging to the surface through the inner tube of the helium-3 collector coil.

The pattern repeated itself over and over for each sought after element. On the surface, the earlier copper disk transformed into a gradually rising cone, filled with volatile rich regolith.

Luis was mesmerized by the holo-view animation of REGEER nanorobots methodically working the regolith like an endless colony of ants. In fact the mine-cones were more comparable to anthills than an actual mine. The nanorobots crawled down into the regolith in a flawless golden spiral pathway. Billions of the microscopic machines joined in a formation resembling a steel wire rope several centimeters in diameter, consisting of pairs of strands. Each pair of strands was programmed to forage for a specific volatile and ferry back the specified material to the mine-cone for retrieval by the volatile harvester, *Bumblebee*. The process fascinated Luis to the point of reverence for the sheer beauty and efficiency of this supreme nanotechnology. He was on the verge of becoming a true convert to the efficacy of the REGEER were it not for the vile byproduct now focusing his attention. After the nanorobots completed their mining objective, they crawled back to the mine-cone for relocation to a fertile zone. However, similar to the behavior of real ants, the nanorobots left a trail of residue. Unfortunately, unlike the pheromones deposited in ant trails, the nanorobots excreted a trail of toxic radioactive waste.

“This is both fascinating and horrifying,” Luis explained. “I don’t exactly understand how they leave a radioactive trail, but I can tell you that these nanorobots will implode after a very limited number of rotations ... or relocations, as you call it. They will simply burn out as a result of generating such high intensity heat in despite operating in super cold South Pole temperatures.”

“Maybe that explains why Megalith Lunar ordered us to rev up production like there’s no tomorrow. They knew what this stuff would do in a short time frame.” Hawthorne revealed.

“Yeah, they knew alright,” Luis affirmed.

“There must be something we can do about it?” Hawthorne implored.

“Don’t have clue right now. This will take time to figure out. Meanwhile we’ve got to shut down the mining zone,” Luis asserted.

“Captain North will fight to keep production going. Megalith Lunar hired him for good reason. Always charging forward, never quitting. Never!” Hawthorne stressed. “Speaking of whom, I better check with Krasnov before the Captain calls for an update. Observation deck to Krasnov, check in.” After a few moments passed, Hawthorne was puzzled by the lack of immediate response required by Delta Base protocols. “Krasnov, I need your to report in. Do you copy?” Still no response. “This is unheard of. Luis is there any chance they could be up to something? You know like, together? They seemed quite chummy when leaving the deck.”

“Doesn’t seem likely that Sophie would allow herself to, but you never know.” While not puzzled by the lack of response, Luis wondered what kind of trouble Sophie was stirring up because it was clear to him that she had by now, incapacitated Krasnov.

“I’m not supposed to leave the observation deck, but something’s wrong here. Gonna head down to the lab. Don’t touch anything, and stay here. I’ll be right back,” Hawthorne ordered and abruptly exited.

“What the hell Sophie?” Luis cursed to himself. He took a deep breath to compose his thoughts and upon exhaling noticed a blinking red light around the left wristband of his flight suit. “My bio-monitor alert signal? Malfunction? No, wait. It’s monitored by the cargo-pod shuttle ... Vera!” Luis quickly accessed the systems control panel and identified the cargo dock communications link to Vera. “Ranger Luis to Vera.”

“Yes, Ranger Luis. I discreetly activated your bio-alert in order to get your attention.”

“Vera, what’s going on? I’m starting to freak out up here. I’m alone, but not for long.”

“Copy that, Ranger Luis. I will be brief. Twenty-two minutes ago I received a bio-alert from Ranger Tree who is in respiratory distress and piloting the surveyor-skiff away from the volatile harvester deeper into Shackleton Crater,” Vera stated emphatically.

“Alone? Is he alone?” Luis felt his heart hammering through his lungs.

“Uncertain, but we must assume that Captain North is now on board *Bumblebee*. Ranger Sophie is now piloting *Hummingbird* in pursuit of the surveyor-skiff with the intention of attempting a rescue. I have notified Lunar Orbital Command regarding this matter. I am maintaining radio contact with Ranger Sophie on a secure frequency.”

“Sweet Jesus, I knew this would happen,” Luis wanted only to fall to his knees wailing for mercy. “Wait. *Hummingbird* doesn’t have holo-nav? Sophie needs holo-nav in the crater. Hold on a minute.” Luis focused on the control panel thinking, “Why don’t they use an interactive operating system like Vera. Don’t trust it, of course.” Quickly analyzing the holo-nav system parameters, Luis startled himself with the revelation. “Vera, I’m streaming the holo-nav to you now. You must link the holo-nav stream directly to Sophie’s helmet monitor. Tell her that she won’t be able to see the skiff in the stream, but Tree’s bio-monitor telemetry will let her know when she’s close enough to see the skiff with *Hummingbird’s* headlights. Streaming, now!”

“Roger that, Ranger Luis.”

Sophie had never been afraid of flying in darkness, but this was something new, something alien impinging on her self-awareness. As a pilot, her intuitive ability worked in tandem with her astute navigation skills. Now, she flew in a direct horizontal path maintaining constant altitude at 3,500 meters, feeling rudderless and disoriented. At her current speed, *Hummingbird* would hover directly above the surveyor-skiff within five minutes, still needing to descend more than three kilometers in a vertical path in order to rescue Tree.

“How many more minutes can Tree last down there? Alright Luis, time to come through for me. I’m flying blind. Come on now,” Sophie pleaded. *Hummingbird* flew effortlessly without air resistance. The tiny craft was programmed to reduce speed approaching the point of descent to Tree’s bio-monitor signal. Surrounded by blackness, Sophie focused on the instrument panel indicator operating as a proximity beacon to Tree. “Ranger Sophie to Vera, approaching vector, disengaging autopilot and preparing to descend to the surface. Now or never!” Bracing for a nosedive with her feet pressed to the cockpit floor, she arched backwards and re-engaged the

thrusters accelerating into a vertical drop. Sophie calculated traveling two minutes until needing to reverse thrusters. After that, she would need a lot of luck.

“Thirty seconds to reverse thrusters, then what,” she wondered. Without warning, a flash of brilliant blue-green light assaulted her helmet visor. The darkness evaporated into ambient daylight as Sophie imagined herself falling into an ocean.

“Hallelujah Luis!” she shouted. Adrenalin pulsating through her body, Sophie abruptly shut down her thrusters, choosing to glide down to the crater floor where Tree awaited rescue, she hoped. The scene displayed in her helmet monitor was haunting. Sophie had never traveled the depths of the ocean in a submarine, but she knew it must feel like this. Floating downward to the bottom of a shallow canyon only a few hundred meters wide, Sophie recognized the pattern of a crater within a crater. The deeper she dove, the illumination shifted darker until the indigo-blue hue of the jagged crater walls indicated the lower levels of Shackleton. A map indicator flashed in her visor, “Entering Raven's Gorge.” Looking down into the gully, pitch blackness awaited. The holo-nav avoided mapping this desolate chasm below the crater floor.

“Ranger Sophie, fifty meters to target, please engage reverse thrusters for landing,” Vera announced.

“Copy that Vera, preparing for landing.” Sophie switched off her helmet monitor to focus on the cockpit monitor as she powered on the landing lights. “There he is.” The surveyor-skiff perched precariously with its tail against a large boulder nose down at a near 45-degree angle. Sophie guided *Hummingbird* to hover in position directly above the skiff. Sophie sensed she could almost reach out and touch Tree. No interior light emanated from the skiff – now powered down completely. If alive, Tree was freezing and asphyxiating at the same time. Sophie’s tears blurred her vision already compromised by the feeble landing lights.

“Ranger Sophie, you must first access the pilot section by opening the canopy emergency release lever at the forward windshield. Quickly power up life support systems. The current surface temperature is 82 degrees Kelvin, which is minus 191 degrees Celsius. Your flight suits are only sufficient to sustain your normal body heat for mere minutes in this atmosphere. You must proceed without delay.”

“No kidding.” Sophie felt the bitter coldness during the entire the short flight from Delta Base. “What about Tree’s vital signs?” Sophie prayed he was still alive.

“Ranger Tree is not breathing. His emergency air supply emptied several minutes ago. He is unconscious with a faint and slow pulse. He is experiencing moderate to severe hypothermia which is actually prolonging his time for survival. When life support is restored, please command the system to respond to the bio-monitor alert by activating emergency resuscitation measures in his life support harness. Please hurry Ranger Sophie,” Vera implored.

Sophie depressed the red button in the mid-chest portion of her own flight suit, engaging the emergency air supply. Opening her canopy, Sophie released her harness straps, raised her arms and effortlessly floated out of her seat. Then, like an acrobat, she arched backwards, twisting to align her body with the curvature of *Hummingbird* and aiming for the skiff beneath, only a body’s length away. She quickly located, turned and pulled the canopy emergency release lever to the vacant pilot’s compartment. Instantly, the interior light illuminated the cockpit. She knew what to do next. Sophie adroitly slipped into the pilot’s cockpit and sealed the canopy.”

“Engaging all systems. Activating emergency resuscitation measures in his life support harness, now. Vera, please tell me it’s working? Is he alive?”

“One moment please. Monitoring ... life support harness is administering CPR, oxygen and intravenous resuscitation measures. Ranger Tree is responding. Vital signs indicate breathing is resuming and heart rate is increasing. He is regaining consciousness. I am connecting Ranger Tree to our secure frequency,” Vera informed.

“Tree can you hear me. Do you copy?” Sophie shouted.

“Copy,” Tree whispered faintly.

“Tree, you really scared the crap out of me this time. How did you screw up so badly?” Sophie demanded.

“North ... bastard tried to kill me,” Tree muttered, slowly gaining awareness.

“What? North will pay dearly when Lunar Orbital Command hears about this,” Sophie avowed. “Tree, I’m gonna fly you back to Delta Base in the skiff and find a way to retrieve *Hummingbird* later.”

“*Hummingbird*? Here? How?” Tree managed to ask, groggily.

“Long story short, Vera and Luis helped me to rescue you. Thank us later. Now let’s get out of here,” Sophie insisted.

“Sophie wait! Can’t just leave like this ... got to stop him,” Tree pleaded.

“Tree, you’re still in *la la land*. There’s no way to ... hold on a minute. Hey Vera, Krasnov said something about the REGEER being nanotech. Does that make any sense?”

“A possibility Ranger Sophie. However, a significant energy source would be required for their deployment in the regolith,” Vera answered.

“Right, that’s exactly right. Tree, how do you feel right now? I might have a temporary solution, but you need to be able to pilot the skiff. Can you?” Sophie asked reluctantly.

“Think so,” Tree now breathing own, still felt dizzy and disoriented. “Maybe,” he added meekly.

“And maybe not,” Sophie provided the better response. “Vera can you help me set this surveyor-skiff to auto-pilot itself back towards *Bumblebee*? And notify Lunar Orbital Command that we require assistance. I’m taking *Hummingbird* out for a test of the Magnetic Current Resonator. I was deprived of the chance to test it fully in North Korea. Let’s see if we can put a plug in the mine-cone operation.”

“Copy all of that Ranger Sophie. May I ask, what is this Magnetic Current Resonator?” Vera queried.

“The MCR generates a virtual magnetic current. Luis can explain it better. He developed it to basically stop the processes of radioactive decay, somehow making inert all the particles of ionizing radiation. This effect is only temporary. In theory, there’s no proof for the existence of a magnetic current, but Luis figured out how it should work. The MCR, as I understand it, kind of freezes in place radioactive particles. The only problem is that the MCR does not generate an *actual* magnetic current, but a virtual one, so the effects are short-lived,” Sophie underscored.

“Ranger Sophie this is very interesting. One more question, please. Does the MCR generate a positive magnetic charge or a negative magnetic charge?”

“Good question Vera. The MCR can do both, but not at the same time. Luis originally configured the device to act like a magnetic monopole with a positive net magnetic charge. But it can reverse polarity and generate a negative net magnetic charge, as well.” Sophie added.

“Hey you guys, my head is pounding but I’m startin’ to feel like my old ornery self again,” Tree chimed in. “Just point me in the right direction on auto-pilot. I’ll take over shortly.”

“Roger that, Ranger Tree.”

On the bridge of *Bumblebee*, four technicians sat in a semi-circle facing outward. Chief Engineer Dawes stood behind them viewing each of their work station monitors. Revelin North reclined in Chief Engineer Dawes' command chair with his right elbow braced on the armrest while picking his teeth like he had just finished Thanksgiving dinner. His self-satisfied grin spoke volumes, but Dawes appreciated none of it. A REEL Ranger was stranded out there on the crater floor and who would ultimately take the blame? "Not me," Dawes thought to himself, feeling insubordinate. "To hell with North. He's not a real captain anymore and this ain't the Navy."

"Captain North sir, we are rapidly reaching the point of diminishing returns in this mining zone. In light of our predicament with the Rangers' investigation now gone awry, I recommend that we ..."

"Dammit Dawes, you know this operation is worth gazillions! Do you think one rogue Ranger's life is gonna stop this show? Megalith Lunar won't allow that. We'll just pull out from here and set up shop in another region of the South Pole. In a few months we'll be back home and set for life." North proclaimed.

"Yes Captain, but the REGEER ..."

"REGEER be damned Dawes!" North interjected.

"Captain North," Technician #3 alerted. "A surveyor-skiff is approaching directly towards *Bumblebee* from quadrant 8, flying on autopilot."

"Really? Our lost Ranger has wandered back to us? I'm more than a little impressed with our auto-pilot navigation," North responded surprised but not stunned. "Scan for life support."

"Life support is not functioning. I do not detect any vital signs on board," Technician #3 verified.

"Well, that is unfortunate. When the skiff is within range, take control of auto-pilot and send it to the dock for recovery of the remains," North ordered.

"Roger that, Captain."

Tree indeed felt like his old ornery self again. Fully oxygenated and astutely aware of how North had duped him, Tree was ready to take advantage of *playing possum*. North's last morbid advice about activating the emergency air supply was now being used in Tree's favor. Alerted to his approach, *Bumblebee* would be ready to assume control of the skiff within minutes.

"Yeah baby," he thought to himself while switching off auto-pilot, reactivating life support, and opening a radio link.

"This is Deputy Chief REEL Ranger Tremaine Mays hailing Captain Revelin North. You are hereby ordered to cease all mining operations immediately upon the authorization granted to me by the Space Exploration Administration. Comply without delay or face extreme measures," Tree declared.

North jerked forward in the command chair, ready to pounce on the speaker broadcasting Tree's message. For a moment, North stopped breathing as his heart constricted in his chest causing a near heart attack. "What is this? Some demonic resurrection? Are there evil spirits on the moon railing against me?" North fumed. Then, refusing to be outdone, North regained his composure. "Good of you to return to us Ranger Tree. We were planning to recover your

remains shortly, but you are saving us precious time. Time to meet our production quota,” North grinned smugly.

“Alright North, as you may recall, I promised to bury you. I don’t mind sending your crew with you, as well,” Tree seethed with anticipation.

“And so, are you intending to ram us with that flimsy skiff?” North teased. North turned to Dawes who stood rigid with regret for the ensuing tragedy. “Dawes, it’s time to end this. Retract the proboscis tube from the mine-cone. We’re not just going to sit here. Give us enough thrust to crush that bug.”

Acting completely in opposition to his natural instinct, Tree turned tail to fly at breakneck speed leading his pursuers away from the target zone, for Sophie’s sake. Tree didn’t mind leaving North and his crew to weather the storm unleashed by the Magnetic Current Resonator. He just didn’t want their demise on Sophie’s conscience. Besides, they actually were blocking her access to the mine-cone. But Tree quickly realized that he needed to flee the relatively open and flat terrain of Indigo Valley.

“I just gotta go where the bee can't go, just gotta go where the bee can't go,” Tree chanted. Navigating towards the Blue Ridge Hills at the center of Shackleton, Tree spotted a narrow passage. “Oh now I see the way to flee.”

*Hummingbird* maintained a gradual approach towards the tail of *Bumblebee*, still undetected in the darkness. Guided by the holo-nav, Sophie glided through the indigo hued panorama looking down, awed by the alien nature of iridescent rocks and mini-craters. Her target, the mine-cone, loomed dead ahead. Although *Bumblebee* was not directly visible, she recognized its shadow blocking the horizon through the holo-nav. Suddenly the shadow lifted, moving forward into the distance. This was her moment. Tree had drawn away the bee from its nectar. Now it was her turn.

Sophie paused the holo-nav to focus on the control console. Powering up the MCR to the maximum settings, she next plotted a flight trajectory to send *Hummingbird* on a high arc ending in a slow nosedive to the apex of the mine-cone. Extending four meters from the nose of *Hummingbird*, the MCR module would fit easily in the mine-cone’s apex orifice, two meters in diameter.

“Here we go, Vera. God help us,” Sophie prayed as she set speed and altitude.

“Godspeed, Ranger Sophie.”

Sophie daydreamed. Climbing higher and still accelerating in her hover car, she zoomed up and over the snow covered peak crashing through the uppermost layer of fresh snow. Sunlight emanating from the snow clouded her vision, so she closed her eyes and drove down the slope, too fast. Sensing the tree line, she opened her eyes just in time ...

“Ranger Sophie,” Vera warned.

Jolted back to reality, Sophie quickly shifted into a glide aiming for the orifice at the top of the mine-cone. Adjusting her trajectory for a perfect vertical insertion of the MCR, *Hummingbird* headed straight down ever so slowly, easing the module through the opening and gently landing, nose braced against the aperture.

“Whoa now! That was a bit too close for comfort,” Sophie exclaimed. “Preparing to jettison the MCR module, but I need to activate the device upon release, then jet the hell away from here. Vera where’s Tree?”

“Ranger Tree is flying through a winding narrow passage in the Blue Ridge Hills with the volatile harvester in pursuit.”

“OK. Showtime Vera. Setting *Hummingbird* for lift off at full reverse thrust upon release of module. Setting MCR for discharge at full power. Simultaneous lift off, release and discharge in 5-4-3-2-1.”

“Captain North, we're losing track of the skiff. We can't follow it through that fissure.” Dawes sighed, exasperated.

“Come on Dawes! Go over the top. Use your head, man.” Catch him when he comes out the other side.

“Yes, sir.” Dawes was no sailor or soldier, just an engineer who badly wanted this nightmare to end. But he complied, ordering the technicians to plot a trajectory that would intercept the skiff as it emerged from the hills.

“Ranger Tree, *Bumblebee* is closing in and will overtake your skiff within sixty seconds. Please take evasive measures,” Vera warned.

“Evade that monstrosity? Best I can do is hightail it out of the crater,” Tree insisted. Through the holo-nav, he could see the wall of Shackleton Crater glowing brighter from its purplish lower layers up to the saffron sheer slope blending to the crimson upper rim. “Aah, another trick I learned from North. He tried to rattle me by shaving the crater wall with the skiff. My turn North.”

Tree emerged from the narrow passage at full thrust heading straight for the crater wall, less than a klick away. On an apparent collision course with the wall, he precisely shifted into a vertical climb that *Bumblebee* could not instantly match. Tree grimaced, bracing for gravity to pull him back. Yet, no such resistance worked against his body in the low gravity of the moon. Upward he flew, seeking a vertical cleft just wide enough for the skiff. Anything that would keep *Bumblebee* from crushing him against the wall-face.

“There he is,” North shouted, as the skiff clearly aimed for the wall. “Don't just follow him. Intercept his ascent. He's going to climb.” Just at that moment, the skiff shifted trajectory from horizontal to vertical. “How could he possibly learn to pilot that skiff so quickly. Who's helping him?”

“Captain North, we are closing in fast, but the skiff will reach the rim...” Without warning, the lights went out.

Finally, clearing the crater, Tree switched off the holo-nav and saw real sunlight. Suddenly, he jolted forward, helmet smashing against the windshield. The skiff somersaulted over and over out towards open space.

Sophie felt the shock wave veering *Hummingbird* off course. Far above Shackleton Crater and the realm of the holo-nav, Sophie gazed down in to the abyss to bear witness. A silver-white dome appeared at the point of her lift off. It encompassed the greater part of Indigo Valley ascending to nearly the altitude of the crater rim, four kilometers high. A few moments later, a beacon of intense white light opened from above, focusing on *Hummingbird*.

“Ahoy *Hummingbird*. This is Lunar Orbital Command Rescue Ship Four. Power down your vessel. We're going to scoop you up.”

“Copy that,” Sophie replied, still stupefied by the phenomenon below. “My team, where's my team?” Sophie cried out in alarm.

“We're already here on board, Sophie,” Tree yelled out.

“Sophie, you did it, it worked!” Luis shouted. “The MCR generated a magnetic discharge that resonated outwards, sending a huge shock wave. What you see down there is some kind of magnetically charged energy field that repels anything near it. Something about the super cold temperatures here magnified the effect of the resonator. The energy field is already beginning to fade, but ...”

“But you did it Sophie,” Tree interrupted. “Saving my ass in the process. Unfortunately, *Bumblebee* and North, also survived. The MCR blast disabled the harvester. *Bumblebee* is drifting away from the moon, as we speak. That SOB is right now broadcasting an SOS. Our esteemed Captain North will hopefully be relieved of command, once he accounts for his misdeeds.”

“And what about us?” Sophie interjected. “What level of pain will Chief Carvallo administer to us for taking matters beyond the pale? Well, whatever Carvallo has to say will be well-received as long as I’m safely back home,” Sophie declared.

“And what would you say if I told you that we’re not going home, just yet?” Tree replied gently. In response, a shrieking high-pitched voice, blared through the ship’s speakers, “No, no, no, nooooooooooooo...”

“Ahoy *Bumblebee*. This is Lunar Orbital Command Rescue Ship Six. Prepare for tow.”

“Copy that,” North answered wearily. “What’s the status of those Rangers, Rescue Six.”

“All Rangers retrieved safe and sound by Rescue Four, Captain North.”

North murmured darkly to himself, “Safe and Sound? Not for long, my dear Deputy Chief Mays.”

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## EPILOGUE

Anna Zheng was not going on any mission to the moon. A child of the Green Revolution of the 2020’s, she was wholly committed to one goal, rescuing ecosystems from destruction – on Earth. Anna graduated *summa cum laude* from the *REEL Rangers Institute* with a doctorate in Ecology. Within a year after graduation, Anna was promoted to Team Leader, Eco-Systems Intervention. No one questioned her rapid ascension. She simply knew more than anybody else about ecosystems.

At this moment her genie-ware had opened a call via holograph to Dipu Patel, Team Leader, Human Resources.

“Dipu, please help me. Carvallo is trying to send me to the flippin’ moon and I ain’t going. What can you do about this?” she demanded.

“Anna, we’ve been friends since our first year at the Institute. You know I cherish our relationship. No matter what.”

“Dipu you’re starting to babble. I called you for help. What do you know about this mission to the moon?”

“Actually, Carvallo called me this morning for recommendations and...”

“You, you recommended me? How could you do that to me? You know better!”

“I didn’t get much chance to think about it. Right now you’re at the top of everybody’s list. Do you have any idea how many Rangers want to transfer to your team right now? You’re a rising star, Anna. It would have been a dereliction of duty to not offer your name.”

“Damn you Dipu, I’m still not going to the bleepin’ moon.”

“Look Anna, it’s a 10-day mission, tops. Look at it as a sight-seeing tour, like a vacation.”

“Dipu, if you were really here in front of me, and not on holo-view, I’d kick you right in the teeth.”

“Anna, if I hadn’t chosen you, Carvalho or the CEO herself would have. That’s the price of stardom. If it’s any consolation to you, I’m also going on this mission.”

“You? Why you Dipu?”

“Why me? It’s simple. I’m Team Leader, Human Resources. If there’s going to be a Lunar Rangers Division, I’m going to help decide who joins. And I had better be qualified to choose who goes to the moon, based on my own experience. Is there any other way?”