Under the Ice

Tim Donlan

For Stephanie,

who says I never write anything for her.

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We watch the porthole as the casket drifts, spinning ever slowly into the void. She reaches over, finding my damaged hand.

"We're letting him go," she says. "Our savior."

Then a rush of waters and visions cascade by, almost too quickly to recognize, each one fading into the next.

Her face, coated in sweat and pain, eyes closed and pleading.

Hands, frostbitten and bleeding, sawed into bloody nubs.

A man, falling through the air slowly, steaming with a black, acrid mist, flailing headlong into a deep abyss.

A pit of steaming fire, ever churning under a billion tons of seawater.

An oblong metal pod, beaten and dented, drifting downward into the dark press of the underocean.

The memories of the past cling to me, searing out of the dark like distant burning stars.

Part I: Void

α

I first see the moon from portside, a glimmer of white eclipsing the wispy storms of Jupiter. It is faint now, weeks away, more real on the greenscan monitors than the natural illumination of the distant sun. Brae drifts close, hair a shaggy raven halo. She graces my elbow and we watch for a moment together. Then the slow rotation of the capsule pulls the porthole down and away.

"Soon," she murmurs, breaking a silence of days. There is little to talk about. The routine of cycle checks and daily hygiene was relegated to grunts and nods months ago.

But she is right. Soon it shall be, completion of our journey, relief from the cramped quarters of the capsule. Robert will be there, flashing a toothy grin beneath bushy red beard, embracing us. There will be champagne and cigars and hot, solid food. A celebration to usher in a brave new scientific exploration. A new page of my life.

It is that night I begin to dream of Ganymede. Brae is beside me, her warm curves soft and full. She slowly breathes the recycled air in a peaceful floating slumber. I myself am long to sleep, but my thoughts grow increasingly vague and mystical, approaching a limit of incomprehensibility. There are abstract shapes, spheres of ice and fire whipping about in endless orbits.

I'm merely a point of light, a pinprick of insignificance being drawn to a sole orb, cold and blue.

As I approach, vast fields of ice spread before me, punctuated by spires of jagged rock, untouched by erosion. Deep furrows and canyons cut patterns for miles, wounds in the crust. They fall deeper than even I can see in my happy dream-omniscience.

A darkness moves across the land, smooth edged, enveloping the entire orb from one horizon to the other. It is the shadow of Jupiter, the mother satellite, swallowing the rays of the sun. It is a weekly ritual. The solar eclipse, so infrequent and revered on Earth, is a regular occurrence on moons. While the nine (give or take) primary orbits bask in the sun most of their billion-year lifetimes, the secondary satellites are privilege to half or less. They are relegated to the dark doom of space, turned away from the light.

Of course, illumination matters little to tightly packed orbs of metal and ice. It is for brave and foolish explorers the light is cherished.

Inevitably, dreams and ideas give way to drudgery. Brae wakes first, unstrapping herself from the night-moorings. She peels off her undergarments and hazily summersaults into the shower. We jokingly called it the blow dryer at first, given the nature of the apparatus. No bigger than a coffin, the washee shuts herself in and braces against the porous walls. With a sudden

boom, an assault of near-scalding mist and steam shoots in every direction, a miniature hurricane in micro-gravity. Afterwards, warm air wafts over and under, hopefully producing a clean and dry individual. I personally can't help but feel a bit waterlogged afterwards, and there is nothing worse than a drop of water against the skin under a pressure suit. The itch is infuriating.

Breakfast consist of eggs and toast in a tube, freshly squeezed. The manufacturers were even kind enough to dye the paste to match the corresponding item of food. The canary yellow of eggs is fine, as is the sandy tan of toast. I swore off brownies, however, following a certain incident. Brae chuckled about it for weeks.

We read the newscasts together, a carryover from the early days of courtship. The headlines take on a somewhat absurd air, blending together in either a generic mash of tragedy or saccharine sentimentality. So-and-so suffering famine or X bombing Y take on far less significance when hurtling through vacuum, literally millions of miles away. Brae focuses her attention, rather, on the latest starlet hairstyle.

The capsule is quite efficient at self-maintenance. The external skin, a composite of atomically aligned carbon fibers, has the ability to regenerate, drawing from a central repository of nanotube "thread". The occasional nick or scratch from space debris is quickly sewn up and absorbed, much like platelets tightly packing the site of a flesh wound. Just as it crusts over into scab

and finally falls away to reveal fresh tissue, so too does the carbon composite.

In fact, an organism is a very good metaphor for the ship. Along with skin, the capsule contains organ systems: circulatory, nervous, digestive, locomotive. A series of vents and ducts recycle the air Brae and I breathe, along with purifying the water we drink and drain into catheters. Even solid waste is recycled, most of it feeding the fusion reactor, but some poly-carbon chains probably go right back into the food paste I eat the next day.

Initially it is a disturbing conception, perhaps even disgusting. But our waste is no different, atomically, from food or the flesh of our bodies. Primitive humans could see that connection even in their scientific blindness. Their bodily wastes, animals carcasses, charred cook fires, even corpses of kin - seeped into the earth, became one with the ground. In time, with the blessing of the gods of sun and rain, that very earth would bring forth new life - crops and game. In that way, the earth was their vessel, self-sustaining and hurtling through space. So too is our ship, living very much as an organism.

I monitor the health of the fusion reaction, ensuring the particle feeds are solid and consistent, that the heat shield has not become damaged. Brae takes samples of the orgo-cultures, monitoring for mutations or clogging biofilms. Genetically engineered from plankton, the cultures use a photosynthetic

process to combine raw materials into edible food - our paste. Microscopic shunts feed down and out of the flat orgo-beds, mechanical cilium driving the energy-rich paste into collection tubes. From there, we add the correct combination of trace-chemicals for taste and color.

Today Brae finishes her chores soundlessly, delicate fingers punching a set of values into the console. Satisfied with the readout, she flicks off the monitor and glides over to the portside window. Our steady rotation fills the window with the red and brown storms of Jupiter every two minutes. Transfixed as the first time, her eyes follow the rise of gaseous giant, immense even here. The curve is barely perceptible, nearly a plain of maelstroms and windy chaos.

Despite the lack of backlight, I can see her reflection in the glass, chin dimpled as it rests on the ledge, blue eyes twinkling. I smile and turn away, back to the work at hand.

We have been married near two years. Our wedding is my last iconic vision of earth, a small outdoor ceremony on a windswept promontory overlooking the sea. I had just finished my doctoral studies at a small private technical college, an offshoot of the west coast software behemoths. Brae wrapped up her biological curriculum the same semester. Following a short tropical honeymoon, we were sealed off in hibernation and shipped to the red planet colony. I was stationed at the poles for a time, hacking

out thermal algorithms. Brae grew the first tundra moss, critical for the Martian atmosphere project.

In those days we grew accustomed to the cold, the threat of thermal leakage, the fear of a single crack in the membrane. Space is a theater of extremes, from the icy silence of vacuums to the horrendous furnace of reentry. Thankfully we were diligent. Our companionship and love also served as redundancy for any action, a buffer zone for frigid peril.

Yet I still fondly remember standing with her on a polar ridge top, watching the sun riding the rim of the horizon at the onset of Martian winter. We were suited of course, but our fingers were entwined, and I couldn't help but feel a sense of warmth from her presence. There was bleakness there, unmatched by anything I'd felt in my earthly travels. And now the bleakness would only be heightened. Ganymede, third moon of Jupiter, a ball of ice and stone. While Mars had its colonies and even the inklings of an atmosphere, Ganymede was stark, empty as it had been for billions of years. Robert was the first to set foot on its outer shell, Brae and I would be the second and third.

We receive updates from him weekly, when our vessel has direct line of sight with the moon. It's usually a simple beacon acknowledgement, Robert's settlement shaking hands with our pod. Other times he'll broadcast his findings, musings of solitary life, a ribald comment directed at Brae. We share a laugh and

return the favor, including photographs of our smiling faces and the starry scenery.

So it is a surprise when Brae calls me to her console. “Cal, look at this.” There is a hint of concern in her voice. I drift over, slowing myself with a firm grip on her shoulder.

There is a message, text, gleaming in small square characters on the screen. Coordinates. Then: “-I may have a visitor within 48 hrs. Best of luck. Always - Robert.”

It is puzzling. First, the nature of the message. The moon is still behind the mass of Jupiter - a simple broadcast communication from the surface encampment would not reach us. Unless Robert launched some type of emitter satellite.

“Check the meta data,” I say. “There should be broadcast information, a signature of some kind.”

Brae complies with a quick flick across the console. She filters the relevant tags and highlights the culprit. EBS0918. Emergency Beacon Satellite.

“Grab the locs. Let’s do a trajectory on it.” My wife nods, her brow furrowed. Deftly, she lifts the metadata coordinates and current location into a mapping application, letting the computer crunch calculus.

“It’s twenty thousand kilometers distant, vector heading of 180 point 45 point 0.” She looks up. “He shot it right at us.”

"So it seems. Given that the moon is rotating away he might not have had a choice. Another day and Jupiter could have swallowed anything without interstellar propulsion. But what about the message, sounds grim."

"It does. Let me plug his numbers in."

In a moment the monitor spits back the results in smooth red swoops. Ganymede itself is the point of reference and Robert's mysterious visitor is still a quarter million meters distant. Unfortunately, the entire Jovian mass blinds us from further observation. What could it be, a Confederate flagship? Meteoroid? Something else?

I shake my head and pull myself down into the navchair, hugging the black nylon mesh. "There's no way to tell what he's talking about. Quarter mil in forty-eight hours. Could be anything. A ship, asteroid storm."

Brae perks an eyebrow. "I've never known Robert to be so stark. Notice, no dirty jokes. No quips about my figure. Something is up. It's almost morbid, fearful."

"It is worrying. We can probably rule out a ship. Aside from the comet probes, there's nothing but mining vessels beyond Mars. Even with military propulsion I don't think a scout could reach Ganymede..."

"A comet," Brae says, plainly.

"I'm not so sure. Our initial orbit studies pulled up nothing. And how would Robert detect it? He's supposed to have his head in the ground, in the ice, not up at the skies."

"Whatever it is, I didn't like the tone of Robert's message." Brae scoots over to my navchair, nestling into my lap. She wraps her arm behind my neck, snuggling close to my face. "We should drop orbit, catch line of sight with the moon, and try to make contact."

I nod, planting a modest kiss on her cheek. I can see the curve of her neck tint pink, flushing. Her eyes twinkle, moist. "Ok," I say, pulling her close. I waver, unsure whether to reassure her with a mundane "everything will be alright." I hesitate. Even vocalizing reassurance is a lack of confidence. Nonchalance is a better tactic.

Faking a smile, I rise, pulling her up with me. Physical contact is joyous in micro gravity, to say nothing of lovemaking. In a minute, I'll drop propulsion and we'll be draw closer to the gas giant.

But for now for we float, spooning in a nested fetal position. She pulls her hair out of its perfunctory bun, letting it flare into a wild halo of black curls. I run my fingers through the soft loops, watching each strand part and drift on its own trajectory. Then I am once again drawn to her radiant smile, the fire of life in her blue-eyed glance. I close my eyes and we seep into a hazy nap.

β

We drop altitude - falling to the stormy red face of Jupiter - by rotating our craft 180 degrees and firing the thrusters. The decrease in velocity allows the pull of gravity to counteract our angular velocity, wrenching us into a tighter, faster orbit.

When the burn is done, Brea deftly pulls us back around, the wide expanse of black space filling the forward glass.

"We'll pass the satellite, ten thousand meters," Brea whispers, raising her arm to point. I squint, glancing at the console in my peripheral. She is right - the merging beacon draws close, beeping brighter as it nears intersection with our orbit.

Sharp-eyed as ever, Brae catches it first, a miniscule mote of white dust streaking past, gone in an instant.

Its transience is testament to the enormity of space, the astral bodies swallowing up tiny things like ships and beacons. Its purpose expired, the beacon will drift in a long ellipse, an eternity of dead silence and vacuum, finally succumbing to a gravity well.

It reminds me of an incident with Brea months ago on our first journey to the asteroid belt. We had hitched a ride with a crew of ore miners, hardy men reminiscent of the old sailors of earth's oceans. Scarred from power tool accidents, foul of speech and mannerisms, but full of spirit.

Their days were long - often eighteen and twenty hour shifts, aided by stimpacks and quick sleep chambers. The job was mostly monitoring the equipment, but often setting down on the rock, visually scouting and drill bit replacement.

On one fateful day, identical to the others, they lost a man. He had been monitoring a new vein, rich uranium in a low gravity chunk. The drill malfunctioned and the man was thrown off, trapped in empty space. He had neglected a harness or propulsion pack. Stupid, yes, but his comrades understood. Their meager craft lacked the power to catch his tangential trajectory. They said their farewells via intercom, "Godspeed on the journey ahead," and promised to fulfill his final wishes. The poor man was resigned to his fate, perhaps delirious from the dwindling oxygen, but nonetheless stoic. In the end, he was gone, yet another hunk of organized matter adrift in the cosmic sea.

Brea was understandably shaken afterwards. Angry at first, she could not come to grips with the negligence and irresponsibility that had led to one man's death.

"And for what?" she pleaded, to no one in particular, her voice cracking. "For precious minerals. That's the story of humanity, ever expanding, only to plunder his environment, to the detriment of his own soul."

I held her in my arms, watching warm tears as they lifted off her cheek and took flight.

Some would rise, as though summoned by heaven, only to catch in her dark curls. Others escaped completely, independent microcosms of saltwater and dust mites and bacterium, forgotten and adrift like that poor miner.

"Are we destined to it?" I asked brushing away the remaining moisture with my thumb. "Destined to that very tragedy? That loneliness, lost in the endless void?'

"I'm not lost," she whispered again, ever so soft. "There is tragedy, and pain, but there is you."

When we look to space it is the stars we see. The endless void of dark matter is invisible to us, and the myriad planets and moons are obscured by the radiance of their respective suns. There's something to be said of that relationship.

Stars are simple things - balls of self-perpetuating fire. Their primary attributes are size and temperature, yielding luminosity. Compared to the resounding complexity of a living planet, the sun is a dull thing. It blinds us to the life that floats forgotten, adrift in darkness. Why mourn for the life that vanishes from sight, when our eyes are so very feeble? Why mourn for the life yet unknown?

χ

I remember watching the night sky. As a boy, I would crane my neck, attempting to take in the wide expanse from one horizon

to the other. On a clear summer night there was always a perfect canopy to our various games - capture the flag or hide and seek, a backdrop of pinpricks to give the scene a dose of the fantastical, the epic. I remember learning the constellations, forgetting them, remembering them anew. The stars were both grand and quaint - a staple of childhood amongst the treehouses and woodland forts, bike jumps and shenanigans.

Later, I remember sitting out under the night sky on lawnchairs, sipping ever-warming beers and chatting with a select few friends. Our alibi was "watching the stars", and I guess we did, but it was also a euphemism for more. We were searching for something, between the horns of Taurus and the bow of Orion or the occasional shooting meteoroid. We were young men, still trapped in the steady progress of upper education, our lives inevitably shaped by the forces of hormones and midterms.

But there was lucidity out there under the stars, where there was nothing between us and those distant suns but a thin layer of atmosphere and the ever-stretching dark. We could suck in the shimmering halos without filter, letting the light morph into something grand and romantic and epic. Who would we be? What would we become? What girl would we ask to the spring dance?

The stars did not take on specific significance until I began my university studies. Stellar Physics forced me to dust off the old department telescope, meticulously cataloging the various discrete

bodies of the universe, even mapping out the locations of those entities too far to discern - the black holes and nebulas and quasars. At first it had been grunt work, another assignment to chug through with a clenched jaw and a stiff drink. But it grew on me. I remembered the same spots and streaks I remembered as a child, saw the same cartoonish exaggerations of constellations I invented as a boy.

It was then I felt quaint and the universe was grand and epic. For by then my studies had revealed the nature of the universe, the eternal movement of these bodies, their orbits and rotations. Their alignment was eternally shifting. The Orion of the Greeks was slightly slimmer, Taurus a bit beefier. And yet they had not changed for me. I was the tiny speck of light staring up into a vast plane of near-eternal fire. It put some things in perspective.

δ

I remember the day I met Brae. It was offworld. I was late to a neuro-bio class in the west atrium of the elevator dome, and walking with a quick clip through the horizon lobby. I almost bumped into her. She was leaning out over the railing, a waterfall of black curls spilling down her back and shoulders. Distractedly, I watched her as I approached, eyebrow raised, smirking lips.

And then at the most inopportune time, when I was sidestepping her, she pushed away from the railing, entangling her legs with mine. With a yelp I lost my balance, flailing out at the rail for a handhold. She fell back on her elbows and behind with a thud.

For a moment, nothing. Awkward silence. Then peals of laughter.

"Oh, I'm so sorry about that," she said, moving a leg off of mine, attempting to wriggle free.

"It was my fault," I replied, delicately lifting myself off of her. Her face beamed.

"I was just distracted," she said, gesturing to the viewing glass. The last curves of the sun were escaping below the west coast of California. From our vantage point at 120 miles up, lacking atmosphere, it wasn't really a sunset.

I stood and extended a hand. She cocked her head, smiling. "A gentleman," she whispered.

When we brushed ourselves off, I sighed and leaned against the railing, watching her sidelong. "I'm Brae," she said.

"Cal," I muttered. Her eyes lit up.

"That's funny," she said. "Here I am, watching a sunset over California, thinking of friends back home living there. And I meet a guy named Cal. Who says there's no such thing as destiny?"

I grinned. “Quite the coincidence. But it’s not actually sunset over California right now. They probably have two, three hours of daylight left. It’s only sunset from our perspective, over the Florida peninsula.”

Brae feigned a punch. “Is that so, smarty pants? I guess you’re right. What are you doing way up here?”

“Research. I’m taking a class in neurobiology and synthbio encoding.” I looked at my watch. “Well. Was taking a class.” I frowned weakly.

“Oh! Did I make you late?” Brae reached out her hand to touch my own, a gesture of mere good will, yet bringing with it something more.

“How bout yourself? Why would a pretty girl want to strand herself at the top of a space elevator?”

She raised an eyebrow, folding her arms across her chest. “Research,” she said in silly mockery.

“That’s good. We need class clowns up here.”

“Aren’t you quite the hotshot? Well, at least I don’t have chronic attendance problems. Get going Cal.”

I shuffled off smiling, glimpsing over my shoulder. She was back to quiet contemplation, up against the rail, stoically beautiful. “See you around, Brae,” I called with a nervous wave.

“See you around,” She echoed.

ε

The ship hums in the dark. I'm awake, wide-eyed and peering at the dim LEDs beyond the sleeping cocoon. As slow as I can I pull out of the harness, nervously unfastening the final velcro strap. I don't want to wake Brae. She's a very peaceful sleeper. Even in the half-light I can see her eyes twitching underneath their lids, the only outward sign of her dreams. Her breathing is deep and slow, contented. A curled strand of her hair bobs on its own accord I roll over and am in free fall, spinning away.

Something's broken my slumber, a lingering notion. A worry. I want to verify the landing trajectory for the Ganymede approach. The majority of space flight is a trivial matter. An object in motion will continue unless affected by another force. Newton's first law deems it so. The trick is getting pointed and moving in the right direction in the first place. Then stopping when you reach the destination. We'd accomplished the former with the aid of USPA, their clustered computing calculating the appropriate vector in a few picoseconds and feeding the pod's computer. Brae or I hadn't even touched navigation for the last two months.

Robert's signal had altered our course - curving around the gravity well of gargantuan Jupiter to reach the station. But how would his unnamed visitor affect us? All the gravity fields would affect our trajectory to varying degrees, some more so than others.

Jupiter was the primary influence, but even the most infinitesimal force can be multiplied over millions of kilometers.

Calculating the gravitational influence of myriad stellar bodies is not an easy thing. Because we ourselves are moving, it's impossible to get a proper reading. It comes down to making a visual assessment of the surrounding area, extrapolating what sort of planetoids they represent, and then calculating the resultant pull.

The current obstacle is the mass of Jupiter swallowing half a hemisphere of sight. I watch it for a moment, transfixed. Below, red and brown storms shimmer with unknown fury, some larger than cities and countries, others entire earthen continents. They have been swirling for millions of years, chemicals and particles stuck in an eternal tempest. I wonder if entire civilizations of dust rise and fall beneath those noxious clouds.

The reading takes a few moments as the pod's cameras snap high-resolution images of the four horizons, encompassing a sphere. The image processing takes a little longer, subtracting out the red haze of Jupiter and the various metallic extrusions of the pod (which act as mirrors, duplicating the occasional satellite body).

Jupiter has sixty-three natural satellites, to say nothing of the artificial probes and junk abandoned by earlier explorations. This makes for a relatively crowded orbital space compared to other planets. Most are tiny chunks of space rock, asteroids caught in

the centripetal pull of massive Jupiter. There are four moons similar to Earth's, the Galilean moons: Io, Europa, Ganymede and Callisto.

Io is off to deep starboard, white like a skull with orange poles. Only a splinter of Europa can be seen, eclipsed from the sun by its mother planet. Ganymede, our destination, and Callisto, the final Galilean moon, are opposite us and out of sight. Yet given this partial information, the computer can extrapolate the orientation of the other moons from its database and eventually yield their gravitational pull. The program beeps when it's done, painting a rough sketch of the new trajectory on the HUD, along with numerical representations of the new vectors, long decimals of precision.

Satisfied, I switch off the screen, yawn and float back into bed. I hear the click of the boosters firing as I close my eyes and drift off.

ϕ

The morning brings with it a surprise and a miraculous sight. "Morning" is a relative term, given that deep space is not gifted by the rising and falling of the sun across a horizon. The pod has been outfitted with an automatic circadian cycle, set to the length of earth's day.

As the day wanes, the ambient lighting is gradually dimmed, the tinting of the windows growing dark. For the most part it's subtle - we work with direct lighting most of the time. But it's effective. I've worked on mining ships and research vessels without the feature, staggering dreary eyed through thirty-hour days, only to crash into fitful stretches of sleep. It's miraculous how the brain has evolved in tune with the rising and setting of the sun.

Morning comes with a literal opening of the blinds. The port and starboard viewing windows are opened full tilt, bathing the sleeping, central and navigation quarters in the full splendor of the Jovian system. There are the bleak whites of the larger moons, the dark brown flecks of lesser orbiting satellites, and finally the rotating vortex itself - Jupiter.

We are crossing into the dark side, the line where the rays of the sun are cut off by the vast bulge of the planet. It is not a sharp cut but more of an echoing delineation, a zone of creeping shadows, perpetual sunset.

Slowly we enter the invisible cone, the projected sphere of lightlessness. It takes time - our orbit is measured in days, not hours. We enter the Jupiter eclipse, and the white flare that is the sun is swallowed into the maw of a hellish hurricane. Tendrils of gray and black consume Jupiter, the surface fading from view.

And there - Ganymede rising. It is half a sphere of bone gray emerging from the shadows. Splotches of icy white streak the surface, and the dimpled freckles of myriad craters.

Brae floats over, catching me around the waist, anchoring herself for a look.

"There it is," she says.

"Our home," I whisper. "Robert's camp is near the equator, about a quarter orbital turn from our current vector. He set down there for maximum broadcasting range."

Because the moon is tidally locked to Jupiter, it doesn't rotate. The approach and broadcasting vectors are always be the same.

"Want to ring him up?" Brae asks, squeezing my side. "I'm sure he'll be glad to hear from us."

"And get the champagne flowing." I grin. Touching the console, I pull up the transmission interface. Robert's frequency is matched to small animated portrait of the man, red beard and all. I send out a ping to see if I can raise him.

"Cal," Brae says. I look up. Her arm is extended out to the viewport, finger aimed at something on the sun-side of Ganymede. I squint.

A line of blue fire seeps from the darkness of Jupiter's surface, trailing out long behind a near-invisible ball. The ship's cameras magnify the image, zooming in on the specks of light, painting them blue and white across the HUD. A comet, riding low in

Jupiter's gravity well, flaring up from the pressures of magnetism and radiation. Yet it burns on, hurtling unstoppable on its course. The computer crunches numbers. Collision.

"Robert's visitor," I say. The red vectors on the HUD speak for themselves. The research camp lies a mere fifty kilometers from the point of impact. Brae knows and nods.

As miraculous as it is vast, it is a dooming sight. I am deflated and lethargic.

The transmission interface begins to blink, Robert's avatar flashing. He knows we are coming, but too late. It will be goodbye.

γ

The man greeted me with a bear hug, a meaty crush that lifted me off the ground and sucked my face into the recesses of his orange mane. He laughed heartily as he sat me down and stood back, his hands still wide.

"Cal! Excellent to see you, young man. How is life?"

He had just returned from an Antarctic expedition and his manners were certainly more suited for polar climes. I nodded. "It's good to see you too, Robert. How did the research go?"

He shook his head, grinning beneath the beard. "I'll say, you should see the plume vents. Like nothing on this world, Cal, tube

worms as big as your arm lining the entire chimney. Towers over the sub down there in the dark, spilling out from the hot guts of the earth."

"I'll bet. Any new findings?"

He frowned. "Preliminary, real rough stuff. Davidson has some edgy ideas. Something about the chemical makeup preventing the isolated evolution of the chemosynthetic archaea. I disagree. Europa will let us know."

"Europa," I say. "When's that going through?"

"Next year. Funding's been approved." He grinned. "I can't wait."

We had followed up the reunion with a trip to the local pub to wax nostalgic on old times at university, research opportunities won and lost, future dreams. In another time, Robert would have been a Viking, an explorer, a conquistador. His scientific prowess was only a vehicle for his relentless drive to uncover and reveal.

I remember a backpacking trip we once took to the High Sierras of California in late fall. I was wary of the weather, the dropping temperatures, the threat of precipitation. But Robert saw it as a boon, another element to challenge and overcome. We shouldered our heavy burdens down the slope of yet another ravine, miles away from the closest shelter. Above treeline, there was nothing between us and the voracious clouds but miles of boulder fields and jagged overhanging cliffs.

When it began to snow, I caked on the layers, burying myself under hat and hood, hiding any square inch of exposed skin deep within my coat. The wind was vicious, sucking the words for our mouths, preventing conversation. Robert was barely covered, chugging red-faced and smiling up the passes and back down into the valleys. We finally reached the campsite, a snowy corner nestled beneath monstrous pines and sequoias. He shook the snowflakes from his shaggy locks like a big red dog, puffed in the frigid air and screamed joyously to the heavens. I was merely content to huddle in my sleeping bag. The next morning he stripped down and scrubbed himself clean with freshly fallen snow. "That was fun," he laughed while I shivered.

That was the last time I saw him earthside before he shipped off to Europa. We kept in close contact over the two-month voyage, exchanging technical papers and data dumps. I had faith in him. His boyish enthusiasm would carry him through the frustration of the Europan colony, with all the setback and tragedies. He'd probably end up a hero.

He had been right, all of it. Within the first months of subsurface exploration, the Europan vents had been discovered, and with them microscopic life. Robert's theory had been validated. It heralded a new dawn of exploration and innovation - hundreds of brave souls venturing out into the unknown to stake their claim to something genuinely new.

I remember the launch of the ill-fated Magellan from the USPA East Elevator shipyards, the big hull clearing the berth by agonizing inches, the cheers going up when the boosters first fired. I remember the nonstop news feeds when the magnetic particle fields failed and a high speed asteroid ripped through the hull, plunging unsuited passengers into deep vacuum. I remember when the icy crust of Europa cracked, swallowing half the initial settlement, exposing another hundred civilians to the airless cold.

And through it all, Robert smiling on the uplink, blushing through his beard, a fine Irish prayer for the deceased. "Death is nothing at all," he said. "Everything remains as it was."

η

"Don't count me out yet," he growls. "The blast may be absorbed. The crust is thin here, the rock could punch right through to the underocean."

"Maybe..." Brae mutters. I keep my mouth shut. I want to change the subject.

"What have you found down there, Robert? Anything interesting?"

"Had you any doubts, Cal!" he roars, chuckling. "I've maps of the underocean currents, ice formations, depth readings, pressure and temperature gauges, crust fissure coordinates. Reams of data I'm sending your way."

"Have you notified Europa?" I ask. "Maybe they can send a pickup?"

"It's no use. Those cheap bastards only expend fuel on USPA sponsored clients. Nothing for us out on the fringe. How bout yourself, Cal, you gonna set down somewhere to wait it out?"

Brae and I haven't gotten that far. I look at her, questions in her eyes.

"I don't know, Robert." I block the outbound for a moment.

"Brae, is there any chance we can beat the comet and pull off a pickup? Have we done the calculation?"

"The pod could probably withstand the radiation wave if we were off the surface," she says. "But it's a question of maneuverability. The pod isn't set up for that sort of landing turnaround. The boosters don't have anywhere near the juice needed. And we'd need to dock with Robert's airlock, can't just swoop down and pick him up." She shakes her head. "I'd say no. I'm sorry."

I nod. "That's how it is." I resume the outbound transmission. "Robert, we're gonna sit tight. Keep uploading the data, I'm interested to look it over."

"Gonna pick up the pieces, eh?" he mutters morbidly. "I hear ya. I got a few tricks up my sleeve, take care you two." He winks and shuts off.

"Godspeed," I whisper.

Brae and I watch the spear of blue fire lance ever closer to the largest moon of Jupiter.

ι

When the transmission finishes, many terabytes of data and commentary, I see that Robert has enclosed an interesting postscript.

"I have decided to suit up and emerge from my hut under the ice. I will not cower in shivering fear, but will face it full on with my own eyes. Be prepared for the video uplink. Remember, death is nothing at all. In the words of a man of my name, better than I, who perished in the ice and snow:

"*But take comfort in that I die at peace with the world and myself - not afraid.* - Robert Falcon Scott."

Brae licks her lips as she reads it. I can see her eyes beginning to water, the moisture breaking away in tiny floating orbs.

I catch a tear and rub it into my palm.

φ

First grainy static as the compression unwinds, horizontal lines feeding out, scrolling like archaic film reels. The sound kicks in, a faint roar. The atmosphere of the moon is minimal, a fraction of Earth's, a few wispy layers of oxygen and nitrogen clinging to a

flimsy gravitational sphere. And from that atmosphere, the banshee wail of the wind, alien in its calling.

The picture is gray at first, the natural light on the surface of the moon. Gray hills, gray ice and mounds of piled frost. Then the digital equalization picks up, and the color tones of the sky filter down - the red of Jupiter filling half a hemisphere, straight up from the horizon, vertically across and over. Beyond that delineation are stars, still burning bright beyond the other ambients, pinpricks of white.

The picture pans and there it is, blue fire. It is a sun of its own, luminous and near blinding at the center. It looks to be moving slowly, but I know better. It is a ball of ice and iron traveling at one hundred thousand kilometers per hour. Forty six miles a second. It has built this speed over millions of years, pinballing around the deep solar system, slingshotting off the gravity wells of the sun and countless planetoids. And now it comes for its final collision. This infinitesimal slice of time where it too dies.

A gloved finger enters the foreground, followed by the suit-clad forearm, red striped and puffy white. It is Robert, pointing to the heavens, to the comet come to claim him. The camera pans behind, following the pointer, not quite at the center of the blue fire, but to very edge of Jupiter's dark side.

Sunrise. It is a small thing, the sun, peeking out now from the monstrous curve, but it is larger than the stars, near as bright as the comet itself. The new light catches in the streaking tail, and for a minute the digital encoding is overwhelmed by illumination, whitewashing the picture into snowy nothingness.

Then the focus returns, the finger behind it, pinpointing the newly risen sun. The comet roars ever wider, the blue swallowed up in the heat. Robert pans one eighty degrees, and we see his face. Beyond the reflection of the mask, I see the thatch of his thick red mane, the pointed determination of his eyes, his mouth upturned in a subtle smile. He says nothing, pursing his lips, ever holding that same smile. He winks.

When he pans back around, there is nothing but white. The white of the ice towers, shaped by the shifting winds, melted to misshapen mounds by subsurface eruptions. The white of the ground, crystals of frozen oxygen and water. The white of the sun, drinking in the light. And the white of the comet, moments from swallowing the world.

The camera bobs, bouncing forward. There is the flash of an arm, then a boot. It is Robert. He is running forward, set free in the low gravity. Up a steep tower of crusted frost, crunching deep steps into the loose ice. He reaches the peak, a spire overlooking a vast expanse of barren frozen waste, a forgotten stretch of the universe now brightly revealed in the fire.

For a moment he pauses, watching the luminous scene. Then he leaps up and out, rising ever forward, consumed in the glow.

ĸ

They told us we were too young. They told us married couples were not ideal, that the strife of a young marriage would interfere with valid research. We had numerous counterexamples, but it fell on deaf ears. The means of funding grew continually fringe after the leading universities and institutions denied us. Brae's parents put some property up for sale. My brother did the same, offloading some collected art pieces on the net auctions.

And so it became more of an extreme vacation then a valid scientific exploration. I remember sitting earthside in the sun the summer before leaving, watching the swaying trees and slowly drifting clouds. Brae was beside me, reading a paperback novel and sipping iced tea.

"Will the journals even accept your findings without association backing?" She wondered aloud.

I frowned. "They better. It's absurd that all the exciting work is being done by people on the edge. The fringe. The big universities just perpetuate their own culture of grant giving and brown nosing."

"Tragedy," Brae muttered, crunching ice. "That's the trouble with pure science. Engineering and design is a lot more interesting - freelancing is viable. Publishing findings is suicide, they're valuable trade secrets."

"But what about common knowledge?" I countered. "The common good? Some things should be shared by everyone; it brings about more far reaching change. If everything was proprietary, integration would be a nightmare."

"Well if you think the reproductive habits of the Europan Thermobactum is vital knowledge for humanity, you have my sympathies."

I watched her sidelong, the skin under her skimpy top sheening in the sun, browning with freckles. "What do you want to get out of it, then? The trip."

Brae crunched another piece of ice, raising an eyebrow. "Why, I don't want to leave my hubby."

She leaned over and kissed me, forcing a cold sliver past my lips. I grimaced. "Always the jokester. Always the clown."

She climbed off her lawnchair and onto mine, straddling my bare legs. Leaning forward, the curled black strands formed a nest, hiding our faces together. Between kisses she whispered, "Are you ready, Cal? Two months in the cold void, another six on the ice?"

"I am," I returned, nibbling her nose.

"You don't want to just stay here in the sun? We have cozy jobs. Plant ourselves here, work on the house." Her tongue wound beyond my teeth and I sucked it in gently. She pulled back to whisper again. "Make a baby..."

I pushed her away for a moment. "We're not ready for that yet, Brae. Not yet."

She twirled a strand of hair seductively, again raising her fine black eyebrow, giving me a look. "You're no fun," she said, stretching the black tank top over her head. Hands behind her back, I pulled her close. The sun beat down on us, burning our backs brown before the long freeze.

λ

Waves of heat still rip across the Ganymede crust, melting long gouges in the ice shelf. The exposed underocean boils into towering clouds of steam and mist.

Our course is unchanged, still set for a landing in Robert's camp in a few hours. After the vidfeed cut out, we said nothing, only watched solemnly the scene before us.

"We should make a pass," she says. "Take some pictures of the damage from low orbit. Once it cools off we can land, see if there's anything to salvage."

"What about the radiation?" I ask. "Can the pod handle it?"

"Probably. If we up the charges on the skin I think we'll be fine. Getting up and walking around the ice crust is another story."

"It'll be open ocean for a good day or so," I say. "It'll take some time for the ice to build up, cover over the impact site. That hole has to be at least a hundred miles long, half as wide."

"Let's check for geothermal activity," Brae says, pushing off a storage bin and to a side console. She straps herself in but stays vertical, her feet hovering over her head like some hibernating bat. "Robert's sensors are gone," she says. "But the cameras are detecting heat signatures north and west of the impact zone. Those could probably be eruptions."

"Or just chunks of shrapnel. Brae, what's the point? It'll be months before we can do a valid exploration. We'll need to refuel by then, restock supplies. Why not just slingshot around and head to the Europa settlement, or even the new Callisto colonies?"

"And live with those smelly colonists? I'd rather not. And besides, I came on this expedition for some alone time..."

I sigh. It seems inappropriate given the recent loss of a colleague. "Brae, fine, we'll do one pass. Get some good imagery, analyze it as we swing around. We'll decide then."

She unhooks herself and pushes towards me, spinning head first like a torpedo. I tap my foot off the bulkhead, dodging the head butt, locking elbows as she moves past. Her momentum

yanks me up and around and we twirl in freefall. Brae leans close, her hair flayed behind, eyes wide. We embrace.

"I love you," she says.

I nod and smile. "I love you too."

μ

When a comet travels through deep space, it is affected by little besides its own momentum. Its myriad atoms- hydrogen and oxygen, carbon, silicon and iron - are aligned and move as one. The metals clump together, solid and cold. The carbon and oxygen form muddy slime, still frozen in the frigidity of the void, but softer than the core. The outskirts of the ball are ice, hydrogen and oxygen chains tied together in ionic bonds, aligned in crystal lattices by the necessity of their very molecular shape.

As the comet is pulled from the outer orbits into the voracious gravitational maw of the inner solar system, changes begin to take place. The heat from the sun melts the ice, splintering tiny specks across the void - the tail. Other minerals and molecules are shorn off, giving comets a vast spectrum of colorful streamers. The solar wind - radiated particles that have literally evaporated from the sun's coronal atmosphere - sweeps through the comet as well, often forking or flaring the tail into a fan.

Yet it is impact where the true changes occur. The very atoms that make up the core are ripped apart, shredded by the process of fission. The kinetic energy of a comet impact is equivalent to hundreds of nuclear weapons.

Under the intense heat and velocity, the individual electrons are flung from their atomic orbits, changing the very nature of the elements within. These unbound electrons whiz about, desperately seeking a host, an atom with which to bind. Of course, there are countless other atoms that have become ionized during the horrendous explosion, losing their own orbital electrons. In the case of a comet impact, the energy is so great the very nucleus of an atom splits apart, releasing a spray of neutrons, protons and energy in the form of photons - the particles that make up light. This is the nature of nuclear fission - a chain reaction of exploding atomic nuclei.

Humans have traditionally accomplished fission with very heavy elements - uranium and plutonium - that contain very large nuclei. This is because once the initial reaction is kicked off, the core of these elements contains so much energy - literally hundreds of protons and neutrons.

Fusion is the next step. The loose atomic particles combine to produce new matter. This is the process in the core of stars - hydrogen undergoing continuous fusion to create helium and

energy. The reactor of our very pod is a small, controlled sun, utilizing recycled hydrogen for energy.

But compared to the Ganymede comet, the fusion inside our pod is an extremely tidy process. The fuel is filtered and processed before entering the reactor. The energy is contained in heavy shielding, the waste products locked away in a carbon matrix and ejected into the void of space.

The comet is a rampaging fountain of radiation and heat. The loose atomic particles are not contained in shielding; the energy is not channeled to a useful mechanical process. Instead, it rages unfathomably strong across the surface of the moon, launching uncountable particles long kilometers into the void. Many are absorbed by the magnetic and particle field surrounding Jupiter, but others continue still farther, to our pod.

Radiation has always been a danger for space exploration. The early astronauts were exposed to many more times the radiation of their earthbound colleagues. They were at peak physical fitness, injected with solutions to prevent lasting tissue damage, and still some came down with premature cancers. Free atomic particles, especially those ejected from a high energy reaction, will knock loose electrons in the molecules in cells, causing irreversible damage. Especially susceptible are DNA and cellular organelles, delicate structures that depend on the precise arrangements of long protein chains. Even a single particle could

theoretically cause a point mutation in the DNA, resulting in mutation or cancerous growth.

Therefore, shielding was a necessity on longer trips. Initial attempts revolved around fields that would bind with the free particles, producing a sheen of newly minted ions. However, the new ion propulsion jets were severely affected, cutting speeds in half. The compromise was a thin skin of ionized metal arranged in a microscopic matrix. The loose electrons would merely fuse with the surface, and the charged lattice would evenly distribute the energy. Protons, neutrons and other atomic particles posed a larger challenge. These had the ability to alter the very nature of the metal, or even pass right through the net.

The solution was a small trick of charges - a magnetic shield. Earth itself is protected from dangerous solar storms and flares by the magnetosphere, a field of suspended ions and electrons. When the solar wind rages in earth's vicinity - the plasma of supercharged protons are absorbed and neutralized. The pod works near identically, creating a directed magnetic field to trap and hold incoming protons and other charged particles. In conjunction with the metallic matrix, a computer algorithm adjusts the direction of the field for maximum stoppage. It's effective in reducing the surrounding background radiation of deep space, and even the occasional solar flare.

But our techniques were about to be sorely tested.

ν

Brae was confident. That was her gift. I was wary, but rode on the wave of her confidence, a force to overcome the inertia of my own misgivings.

We would make a pass of the crash site, let the gravity of Ganymede suck us into orbit, and decide our course of action as we rounded the far side. It would be a high orbit, barely catching into the centripetal pull, giving us a good hour to make our decision. But it would be behind Jupiter, away from the sun, our ports filled with pinpricked black.

In space, it's difficult to let the intuitive understanding of surroundings dictate a proper response. We humans are groomed for gravity, for the sweet rise of the sun in the morning and the setting into the orange west. The discombobulation of the Jovian pinball landscape was something entirely different. Each diverse angled trajectory between the floating orbs held with it a subtle beauty and promise, be it adventure or death. But the intuition of vision was not enough to carry us through.

We could not simply watch the cameras for signs of surviving structure. If pieces of the camp survived the blast wave, fine and good, but that said nothing of the underocean. The ice floes could have ridden the pressure wave, driven hundreds of meters upwards in a tsunami blast. The scene could be placid now, almost serene.

But the cameras would show nothing of the maelstrom beneath the ice, possible geothermal activity awakened by the blast, even the crystalline structure of the ice itself. Landing could quickly become a trap of collapsing ice.

The same with the other hidden danger - radiation. We needed to rely on the ships instrumentation and computers. Even now, the panels were awash with flashing red warnings. Through the port holes, the metallic skin flickered brilliantly as many trillions of electrons bonded with the charged metal, releasing a single photon in the process. The gradient oscillated in waves on the dial, rising up as a burst of particles hit the skin, falling slightly as the new energy was routed to capacitors and repositories.

And then the magnetic shield, sucking in photons and quarks and neutrinos. Invisible to the eye, the HUD registered it as no more than a percentage of total power output. Maintaining the field was terribly taxing on the power reserves, even for a fusion reactor. Twenty percent now, and rising as we approached orbit.

My wife licks her lips, a cautious black eyebrow raised. "It's going up."

I nod. "What if we approach upwind, so to speak? We're heading right into the particle stream with this trajectory. We could cut back some then drop straight down over the impact site, avoiding the cloud."

"You've got a point there, smarty. I'll pull us up."

Brae straps herself into the navchair, a big black throne of velcro fasteners and pressure monitors. Half a dozen levers and buttons are within easy reach, along with the HUD and the best port view in the cabin.

"Gonna rotate first, babe, no power on the front thrusters."

"Okay," I say. "Let me make sure the mag shield keeps its orientation."

With a flick of a lever, the pod backflips, Jupiter's crimson sea of storms swallowing up the pinpricked void. The computer automatically adjusted the magnetic particle shield, synchronizing the rotation to maintain the radiation protection.

"Ok, short burn here, ten seconds."

It's barely enough to overcome our current momentum, and serves primarily to slow us down. Pulling totally out of Ganymede's current gravitational hold would take a much longer burn.

"I want to monitor the power usage," Brae says, already anticipating my concerns. "A longer burn may short out the mag field."

"You amaze me sometimes babe," I say, squeezing her arm. She flashes her teeth and yanks the throttle.

I'm instantly thrown hard against the corner of the bulkhead, ramming my elbow into the hard metal. Against the heavy pull I strap myself down. I can see Brae chuckling in my peripheral

vision. Quite the painful practical joke. "I wasn't strapped in," I mutter.

"Why not?" she feigns innocence, tapping out the seconds with her foot. "A spaceship is a dangerous place, Mr. California."

I grunt, muttering, "No thanks to the certain pilot."

When the burn is done, Brae glances at the mag field. It holds at 20% power usage.

"I could feel it in the throttle," she says. "Definitely has some shudders."

"Figures," I say. "Think we can handle a longer burn? Want to suit up?"

She looks at me dead on. "Might be a good idea. Always be prepared, right?"

I hold my hand up in a three-finger salute. "Scout's honor! I'll pull them out of storage."

The radiation suits will offer some additional protection from the comet's hateful glare if the long burn depletes the mag field. It certainly doesn't hurt to be careful, although the suits are cumbersome and unwieldy.

Out of her chair, Brae twists into a ball, hovering weightless. "Watch this," she says, inflating the arms and legs of the rad suit, leaving the back gaping open. I frown at her shenanigans. With only a touch of the bulkhead, she induces enough momentum to

push forward, expanding her hands and feet at the precise moment to fill the suit.

"They teach you that in flight school?" I remark, having trouble getting my foot through the narrow opening. "That's not fair; these things are made for tiny people!" Brae shrugs, drifting back to the navchair.

"Burn in twenty seconds," she says, making a few adjustments of our orientation with the secondary boosters, tiny nozzles of pressurized gas belching into frigid space.

I growl, attempting to unstuck the zipper from the seam and get the suit sealed before my impatient wife gets me fried. I pull the hood over and down just as she taps the thruster, once again slamming my unsecured form against the painful bulkhead.

For the first half-minute, the magfield holds at twenty, never fluctuating. Then it begins to drop steadily. Nineteen, eighteen, seventeen.

"You watching this, babe?" I ask, voice muffled in the suit hood. She doesn't acknowledge, just holds up the max burn. The outer skin dances with light, filling the portholes with reflective fireworks and dazzles.

A minute passes and the gauge hovers over zero. "Drop everything we can," Brae shouts. "Lights, nav, cameras, culture trays. Everything."

I hit a few switches and we were bathed in darkness. The circulation fan on the bioculture engine slows down, whirring painfully to a stop. Still the burn, the red of Jupiter draining away into Ganymede's skull white fields of ice. A bead of sweat collect on my brow, dripping into my eye, burning hot and salty. The mask of the radsuit begins to fog.

"Ok Brae," I shout, growing anxious. "I think that's good."

She holds on for another twenty seconds before releasing the throttle. "We won't be around long enough to contract the cancer if you keep up your complaining," she says, checking a gauge. "Barely a single sievert. The cultures aren't even toasted. No worries."

"You were getting a little hot and bothered back there," I say, pulling off the radiation hood. "Maybe we should keep the lights low."

She rotates the chair around, fixing me with a glare. Even in the dim light, I can see single strands of black curls plastered to her damp forehead. "Don't even start, Cal. I need you thinking with your head."

"Sure, sure," I mutter. "Just trying to lighten the mood."

"Well do it by *lightening* the cabin first, and getting that bioculture fan back on. And keep yourself strapped in. I'm going to drop into a lower orbit in a minute."

Impatient as she is, she starts the drop before I get the lights back up. But when I hit the switch, the cabin stays dark. Curious, I try the bioculture fan. It too stays silent.

"Brae," I say warily. "I think we had a short."

"My gauges still work," she says, tapping the console at her left arm. A few graphs and figures pulse unmoving in red line.

"Refresh it," I say.

She hits a button under the console. The lights about her immediately go blank, and the cabin is plunged into thick darkness, lit solely by the illumination of the surrounding moons and stars.

"Told you," I say, unstrapping myself. "Kill the burn, must be a fuse or something. I'll get a lantern." The storage closet has a number of old fashioned battery-powered flashlights. Brae lets off the throttle, giving me the chance to rise from my chair without the threat of further bruising.

Drifting into the back of the pod in the dark, I make my way blindly, seeking out the cabinet with my hands. Still wearing the radsuit with thick gloves, I'm unable to unlatch the handle. "Damn these suits," I mutter, peeling out of it, nearly spinning myself into an endless summersault.

When I manage to finally open the closet, a cluster of unsecured items drifts outward, bumping into my chest and face. Thankfully, the flashlight is secured to the inside door. I switch it on, filling the small supply space with sharp beams and shadowed

angles. The loose tools and tape rolls flitter about like bats in the dark, casting ghostly shadows on the metal and plastic.

The circuit box is deeper down, within the guts of the pod. The primary booster drive takes up half the body of the full pod; the computer and life-support systems are yet another quarter, leaving a negligible corridor for maintenance. We call it the Shaft. The name is accurate – it's little more than a mineshaft between rich veins of wire and tubing, circuit boards and heat sinks. The construction is the pod is largely modular, allowing the replacement of most any part, from the smallest trajectory chip to the largest air filter.

Since none of the electronics are working, it's highly unlikely that each individual circuit blew. It was far more probable that a single master connection was overloaded during the extended burn, certainly when the forward mag shield drained down. Probably the engine splitter.

The fusion engine has three outputs: the primary booster drive, the mag shield, and a capacitor for the remaining electrical machines. Either the capacitor shorted out, or the actual splitter fried. Given the primary booster and mag shield were still functioning, albeit marginally, I was guessing the former.

A few gauge tools are floating around, bouncing off bulkheads and dipping into the long trench of the Shaft. I snag a line tester and snap it into the wire feeding from the capacitor to the ship's

auxiliary systems. Sure enough, it's cold. North of the capacitor, the line is hot.

"Babe!" I call. "Gonna shut off the aux systems to replace a capacitor. Everything should be back in a minute."

"Aye, aye, hubby," I hear her muffled reply.

Moving quickly, I fish a spare from a drifting mesh bag, snap off the entry wire, and rip out the burned carcass. There's already enough floating pieces of scrap metal, so I added another to the count. With a neat shove and snip, a fresh capacitor was back in and humming.

"Brae, try the lights."

"Nothing," she called back. "Did you even do anything? We're getting close to orbit."

I test the wire feeding out of the capacitor. It's hot. It didn't make sense. If the capacitor blew from a surge, it would stop the damaging flow. Somehow everything south of that point had been affected as well.

"I think there was an EMP," I yell. "Everything is fried."

"You sure?" Brae calls back. "We still have propulsion. Supposedly shielding, looking at the Geiger counters."

"But no navigation. No lights, life support, food production, communication. Dead in the water."

"You're right about that." Brae is out of the navchair, floating above me with her own light. She scans the length of the trench.

"You think it just fried the power nodes? Or everything, circuit boards, transistors, logic chips?"

"Those are usually pretty resistant. They'll come back in a minute, with fresh power supplies. But it's gonna be hell replacing all those, especially before the batteries die. Are we in stable orbit?"

"I have no way to tell," Brae says. "I need the nav computer for that. I can't eyeball the trajectory visually. And what about the life support? We're gonna start sucking CO2 very soon."

"I can break out the emergency converters. We can hand pump if necessary. The lights - take off the faceplate and tape them to the ceiling, let's see what we're working on."

We move, freed from gravity but pulled by necessity. Time is of the utmost importance, every minute sucking away precious oxygen, every second the potential for orbital decay. The nav system is the first priority, followed by life support.

It must have been an electromagnetic pulse, a vast surge of electrons that burned up the circuitry. It hadn't been immediate - I switched the systems off manually to give more power to the shields. But we had entered the magnetic field of Ganymede. A nuke in deep space or on the earth's moon would not produce an EMP, the radiation would scatter too quickly. But the magnetic field would focus the pulse, drive it along a plane, a concentrated surge directly into the pod. When the mag shield finally went and

Brae reset the console, the continuous EMP fired through, overloading the wires with surplus voltage.

By the time we had replaced two-dozen power nodes, the accelerating orbit carried us well past the site of Robert's camp and the impact. We round a quarter of the moon, and the portholes are filled with the black of deep space, the glare of the sun and the red of Jupiter behind. Only a crescent of the deathly white moon shimmers far off to starboard.

"Give it a go," I say with a silent prayer, budging my wife. She rockets back to the navchair, flicking the switch. Thankfully the LED comes to life, droning through a startup of red vectors and accumulating mem counts.

I rip a few of the CO2 converters out of their casing, tearing the thin plastic membrane off the filters. The spongy material begins to inflate with pod air. I'm, already feeling light of breath, if not from the oxygen depletion, then from the stress overload.

"What about the shields," I say. "If the orbit carries us across the rad cloud again..."

"Refried beans."

"Well, is it?"

"The orbit or the shields?"

"What?" I scream, flustered. "Are the shields up? Is the estimated radiation plume in our current vector?"

"The shield LED is busted so I don't know! And yes, the orbit will put us into the cloud in...ten minutes."

"Wonderful." I pull myself deep into the trench, flicking the light around for the wire tester.

"Cal!" Brae shouts, leaning into the maintenance room. "No use working on those wires, just replace the LED. If it's busted, it's busted, we can suit up."

I frown and shoot past her, grabbing a small console plate on my way up. The dashboard displays are modular, cheap units that pop out as a whole. I push it off with my thumb and slide the new one in place. A digital zero blinks evilly.

"Damn," I mutter, pushing off the navchair, headfirst back through the bulkhead and into the Shaft. Brae is there, testing wires.

"Life support isn't looking good," she says. "These nodes are hardwired with the sensors. Custom built, we'd have to crack them open and weld the new nodes on."

"More bad news. Shields are down."

"Suit up," she says.

There is no use. There isn't enough time to find the crack in the shield wiring, given that most of it is located in zero-G. And besides, the manual CO2 converters won't last forever. Vacuum suits are the best option.

Brae isn't able to leap into the clucky things, and requires my help to secure the rear seal. A heavy oxygen tank straps on her shoulders, fed through an airtight seal into the large glass dome helmet. We strap in.

I switch on the internal mics to talk. "Let's kill this downward spiral and level out. Maybe we can shift orbit out of the cloud."

"Not much time," she grunts. Her voice sounds metallic over the internal mic, mixed with the whine of the helmet air pump. "Entering field...now."

The lights flicker and go, bathing us once again in cool darkness. The white and gray Ganymede surface looms before us in the forward viewport. I can see tiny plumes of steam on the horizon, evaporating through the minimal atmosphere into space. Every millisecond the orbit dies a bit more, and we are brought closer to the surface.

And then we are over the impact site. Still steaming, a gash opened in the ice miles wide, an exquisite valley of boiling water and mist. Mounds of ice are piled along the edges, driven by the withering heat of the blast as waves of water, quickly recrystallizing in the frigid wasteland winds. Robert's camp is nowhere to be found, completely swallowed up by the merciless energies.

"Slowing us down," Brae says. Even blind, she knows we are moving far too fast for a crash landing. We'd be vaporized even

skidding to a stop on the water, let alone jagged towers of ice and rock. Thankfully the throttles are hydraulic, not electrical. Without the aid of instrumentation, she delicately cradles the tertiary boosters in her gloved palm. With a twitch, we backflip, leveling out as the porthole streaks gray and blue.

Then a final burn, the primary booster sucking uncountable ions from the fusion reactor, rocketing them into the surrounding thin atmosphere, an atomic air brake. I am pressed into my seat, a tremendous hand pushing me down and in, many times that of earth's gravity. I feel nauseous, the very organs of my body shivering under the pressure.

Remembering my training, I inhale air, tensing my body, transforming muscles into a rigid carcass. My head clears for a moment and I watch the steam cloud the front porthole, an ethereal, ghostly white.

"I love you," I whisper, straining through the Gs to look sidelong. Brae is there, unmoving, the glass of her faceplate dark. I watch her breathe, as if in slow motion.

"I love you," comes the reply, croaked but genuine. I close my eyes, completing the darkness.

Then impact, and I am gone.

o

I remember the first time we made love. We were still offworld, on the tip end of a two hundred kilometer cable, high over Florida. Her bunk was deep in the belly of the station, a cramped two room box of white walls and flimsy flower print curtains. But there was a tremendous view from the single porthole, an oval double-pane window facing south.

I remember lying there after, sweating and cold under the maintenance fans, watching the tiny cotton clouds cast shadows on the Caribbean islands. She idly played with my ear, tracing a path down my hairline, along my bare shoulder, ever down.

"Have you been to the keys?" I asked, wondering if a thick gray mass was a thunderstorm or merely overcast skies. "What about Cuba?"

"Neither," she said. "Do you want to?"

I didn't answer her, lost in thought. Her reflection was pasted translucent on the window, the rise of her breast matching the curve of South America, her propped arm displacing a wide swath of Jamaica, Haiti and a hundred sprinkled atolls.

"Do you think the storms will be bad this year?" I asked, rolling over. She molded her body into mine, wrapping her legs in a warm pretzel.

"Maybe," she said. "We got lucky last year, only one tropical storm. No hurricanes. But that's right, you weren't here."

"No."

"I've heard stories of the hurricanes," she said. "They stop the elevator of course, so nothing comes up, nothing goes down. Stranded up here above it all."

"It must be a sight to see."

"You'd be scared out of your mind, Cal!"

I pinched her and she squealed. "I would not. I can be very brave," I said solemnly. She only laughed.

"It's really nothing. The station doesn't even move. They did have to replace a cable one year though."

"Frayed fibers?"

"No, the moorings just came loose. So they had to detach from way up here, drop the cable and let it burn up on the decent. Took another week to get new cable in place. By then I was so sick of the rationed gruel, I would have killed for a fresh Florida orange."

"That sounds terribly traumatic," I whispered, nibbling on her ear.

"It was! Scurvy is a serious ailment."

"No vitamins, huh?"

"Poo on you," she said, pulling away and folding her arms across her chest. I rested my head on her cradled breasts, watching her sidelong.

"I like you," I said.

"I know," she said. She began to gently brush my hair, running small massaging fingers through my scalp. I closed my eyes and we drifted off.

On the warm shores three hundred sixty thousand feet below, it began to softly rain.

π

We are floating. Air is entering my lungs, crisp and cold, fresh. I can see nothing, but can feel a gentle swaying, some sort of rocking movement.

Gravity has returned. My inner ear tells me I am upside down, still strapped in the navchair. I try the internal helmet com. "Brae."

Nothing. Fiddling with my lap belt in the thick gloves, I manage to unlatch the fastener. The harness slips off, whipping rapidly around the back of the chair, releasing me. I fall headfirst hard into the ceiling, slamming onto my back, the big oxygen tank beneath me. For a moment I lay there, stunned.

"Cal..." Her voice is pained, distant.

"Brae. Talk to me babe," I say. "Are you hurt?"

"Uh...I can't feel my leg. Right leg. Upside down."

I sit up, awkwardly pulling close my clumsy legs and boots, hugging my knees. I estimate Brae is directly above me, still strapped in her navchair. I could reach up and release her...

Something solid slams my shoulder, immediately flattening me into the hard ceiling and bulkhead.

"Uh," she groans. "That was you, wasn't it?"

"I was going to tell you stay put," I grimace. She rolls off me in the pitch, navigating by muffled touch and feel. Maneuvering in the suits is difficult and awkward, especially given the bulkiness of the appendages, the deadening of the senses.

"Can you find a light?" I ask her.

"Should be one on the suit," she says.

A triangle of white appeared, a cone extending from the blackened sphere of her helmet. I feel along the top ridge of my own, finding the button. Illumination shoots out and I can once again see in front of me. Brae is on her side, peering slowly around.

The pod is a mess. Seasoning packets had somehow been ripped open, filling the cabin with white, brown and yellow powder, along with chunks of dehydrated vegetables. The mesh bag of power nodes had wrapped itself on a bulkhead corner, depositing hundreds of the tiny nodes throughout. The yellow rad

suits hung like shrunken corpses from the jagged nooks of the pod compartments, legs and arms twisted and misshapen.

"Where are we?" Brae says. Her voice is weak and strained.

I pull myself over to her, too weak to stand. "How's your leg?"

A faint grimace feeds through the helmet com. "I think I pulled a muscle."

"We can check for bleeding or broken bones once we get the power back on, and the life support."

"Where are we?" she asks again, obviously dazed.

"If we can restore power I can take some pictures with the ships cameras. The portholes are dark, no stars, sun, sky. We very well could be buried under the snow."

First, I gather some tools. Brae is out of commission for the time being, so it will be a solo job. Peering around the bulkheads and storage counters, I manage to find a wire tester, welding gun, and a handful of power pods. The Shaft is now above me, at eye level, which makes maintenance a bit easier. The labels, however, are upside down.

Thankfully, the fusion reactor is still going strong. I'd need to check the housing for cracks or leaks, but that was low on the priority list. The splitter was good as well, and I was glad we had splurged on the more expensive model. The capacitor was fried

again, courtesy of the friendly EMP on our second (and final) orbital pass.

As Brae had mentioned before, the life-support power inputs were fused with the sensor chips. I'd have to remove both the pods and sensors, pry off the chips, then weld the new pods in place. No easy task while wearing a pressure suit. The thick gloves made holding a delicate tool difficult, let alone a flaming torch. And I had to check the internal pod air makeup. Too much oxygen or hydrogen and our cozy cabin would become a whole lot warmer. High gas makeup wasn't ideal. The impact could have ruptured any number of O2 tanks, or the hydrogen compressor that provided raw fuel for the reactor. The only problem is the atmosphere gauge was on the oxygen tank strapped to my back. Typical brain-dead design.

"Brae," I say, stumbling back to where she is resting. "I need you to read the numbers on this air gauge." I hunch down with my back to her.

"Ok. O2 twenty five. C02 twenty. N2 fifty three, H2 one, H20 one."

"A bit high on the carbon dioxide, but breathable."

"Temperature minus 50 C."

"I'm surprised we aren't coated in ice. Better leave the suits on for now, till we get some heat on." The helmets have a thin vacuum layer and a special sealant to prevent fogging in low

temperatures. I stand and clomp back to the Shaft to retrieve the life support sensors. They slip out relatively easy, even wearing the ineffective gloves.

"Could you help me with this," I ask, thumping down in a pile next to Brae. I dump a jumble of fresh power pods, sensors and soldering patches between us. "Take the old sensors," I say, picking of them up in my clumsy fingers. "Slide off the contact guard. Then snap the bond in the middle. It should break cleanly. Once we're done, we'll solder the new pods on."

My wife starts the grunt work, her fingers smaller and more dexterous than mine. I have a few other necessary things to check. First, the O2 tanks. Hers is about two thirds, judging by the circular gauge on top of her tank. Mine probably a bit lower, given that I am larger and required more oxygen. We have four other backup tanks, secured in storage. But given that the pod O2 levels were above average at 25, I was willing to bet at least one tank had busted.

My suspicions are confirmed when I angle the headlamp into the narrow closet, revealing a tangle of bent metal and popped valves. Only one of the backup tanks looks usable. That gives us two hours of air, maybe more. The air in the pod was fine to breath, if it wasn't deadly cold. Exposed skin would immediately succumb to frostbite if we removed our suits, to say nothing of delicate alveoli.

If the life support soldering wasn't successful, or there was some other irreplaceable fried component, we'd be out of luck. There had to be another way to restore the pod to livable conditions. If I could somehow vent the heat of the fusion reactor...

"Cal," she calls. There is a twinge of fear in her voice.

I clomp back over, headlamp swinging widely as I ducked shelving and containers now bolted to the ceiling. "Yea?"

She holds one of the sensors in her palm, the light of her lamp glistening off the myriad transistors and connectors. "I think it's broken. I'm sorry, it snapped."

I bend down to take a look. The sensor connector has split all the way into the transistor base. I curse quietly into my helmet.

"It's ok babe, not all are required." I just hope the one she broke isn't related to temperature. "Work on the rest, I need to take a look at the reactor."

It's good in a way, something to keep her mind off the hopelessness of our situation. I still have no idea where we are. Perhaps a large snowdrift has broken our fall, gently slowing us down. But the possibility of being buried hundreds of meters below the surface was far more probable.

Regardless, we desperately need heat. The life support heater runs on electricity, feeding through the capacitor. But it's buried deep inside the unit, and requires the soldered powerpods Brae is

putting together. The reactor puts out plenty of heat, but it's surrounded by a near-indestructible heatshield of carbon composite. A small hole vents a bit of heat, boiling water and driving a turbine. Another hole vents the reaction by-product, plasma helium, where first it is cooled then dumped into space.

The plasma is too risky. It's unpredictable, and opening the vent could kill the fusion reaction, which would be the worst possible scenario. But the water vent has promise. Like everything in the pod, the turbine water is recycled. If I could open the recycling valve and pump the steam through the air vent, we might warm the pod. With the turn of a few valves, I manage to route the steam into the dehumidifier. Although it is shut down, it connects to the air vents.

The question is how the temperature dropped so steeply in the first place. It points to a leak, but the pod's air makeup resembles the minimal composition of Ganymede, not merely a frigid earth's. Unless the ice had sealed us in.

"Cal," she says. "I'm done. Let's get them soldered."

"Are you feeling ok?" I ask when I stumble back to her. "Nauseas, lightheaded?"

"I'm fine, Cal, let's get this done." She mates a powerpod and sensor chip, placing them before me. Then she snaps off a sliver of the solder, wrapping it around the connector. I fire up the welding gun, minimizing the arc beam. The helmets automatically

polarized the brilliant light. As the sparks fly we move mechanically and construct the remaining sensors flawlessly.

Brae tries her feet as I shuffle back to the Shaft, popping the metallic pods into the housing. The machine shudders when the final one is locked in, but fails to fire up. "Babe," I say. "Where's that last one? The broken sensor?"

She's stretching her legs, attempting squats. "Here." She tosses it over. I have to nearly lunge for it; I'd forgotten the shape of gravity's parabola.

The last sensor doesn't fit. The bent transistor prevents a proper seating of the contact points. I jam it in, bending the metal further, and the machine began to whir. It's working! But when I remove my finger, it pops out of place, sprung by the bent wiring. Brae sees my dilemma and limps forward, holding a long strip of tape between her gloves.

With the bandaid applied, the life support system hums to life. Fans began to whir inside, starting the ventilation circulation. The turbine steam pumps through the ducts, spewing warm mist from the pod grates. I check the gauge on her back. The temperature is already rising, halfway to the freezing point.

"Looking good, Brae," I say when we finally cross zero degrees Celsius. "Warming up." The pod is starting to look like a sauna and the faceplates are beginning to fog.

"We need a dehumidifier," she says, wiping off her mask with a towel.

"We'll have to wait till the temperature equalizes. I routed the steam right through that unit into the vents."

By the time the pod is a comfortable thirty-three C, our O2 tanks are almost empty. Each breath is growing thin. With a final check of the air makeup and the life support LED I unfasten my helmet.

As the seal breaks, warm air fills my mouth and lungs, a gulp of mist in a summer jungle. Brae follows, pulling the rounded globe off her shoulders. Her hair is crumpled, her face etched with lines of stress, but she's never looked more beautiful. I step close and she embraces me.

"We made it," I say. "For some reason, we're alive."

She doesn't say anything but her mouth is immediately on mine, fused and airtight, dueling tongues within. I close my eyes and let her temporary joy feed into me.

θ

We strip off the suits and work in the warm dark. Brae ties her damp hair behind in a loose ponytail, a few rebellious strands hanging across her cheeks. Even in the periphery of the sheer lighting, I could see her undergarments are soaked with sweat.

The mechanical smell of the pod begins to take on a distinctly human aroma.

But I am content with it, almost happy. It means we are alive and breathing, sweating with beating hearts.

Once the life support is stabilized, I cut off the steam ventilation and let the dehumidifier go to work. It chugs contentedly, sucking long draws of H20 saturated air.

The lights are next, tedious work. The ambient lights are located on the ceiling of the pod, which is now the floor. Not wanting to walk through a field of blinding glare, Brae and I decide to disconnect the bulbs and string them in a chain along the furniture that now fills the new ceiling - chairs, benches, tables, cabinets. Wire is not a problem, there are spooled miles of it in the supply closet. It is the bulbs that don't cooperate. The faceplates are bolted to the floor directly through the transparent plastic instead of a housing unit. Typical brain-dead design. Removing the lights requires ripping out the panels, leaving gaping holes throughout the pod. We settle on a compromise of half the lights, leaving a central walkway unmarred by pits.

But getting the lights up and humming is joyous. The pod takes on the appearance of a holiday party hall with dangling lights and scattered confetti. Brae's mood is visibly lifted.

"When they finally find us, they'll wonder what we were celebrating."

"What are we celebrating?" I ask flirtatiously, reaching for her hand.

"Is it so difficult to figure out?" she says, accepting my extended arm, drawing close. She wraps my palm behind her back and hugs close, her sweating arms around my neck. "I'm celebrating my brave husband."

I grimace. "You're too kind. Come here." I kiss her for a long time, breathing in the taste of her lips, the scent of her damp skin. Then I break away, planting kisses along her cheek, up her neck. "I love you."

She keeps her eyes closed, resting her tired head on my chest. The curls of her hair flit in my mouth and nose. I blow them away playfully.

"We need each other, Brae. We're in a bad way right now, I think you know that. But it's not hopeless. We have a chance. We have air and power and heat. We can work on transmitting a message. We should be able to reach the Europa colony, or further."

"They'll never pick us up, two fringe scientists traipsing around on borrowed funds."

"Don't worry about that, Brae. That doesn't matter. We'll get out of here, I promise."

"You promise, huh." She pushes away from me, suddenly accusing. "You promised to shutdown the aux systems when I told you. But they ended up getting fried. You didn't listen to me."

"Brae, you know I turned them off. We had no way to predict the EMP, let alone that it would hit right as the shields went down. If you had stopped the burn when I told you..."

"At least I was trying!" she shouts. "You bumbled around helpless for a good five minutes, watching the scenery. Did you think it was the time for sightseeing? What did you expect from a comet impact in our vicinity? Some pretty fireworks? Of course there was going to be a damn EMP."

"And you flew us right into it!"

"I was trying to fly around it. The radiation was picking up and we'd be blistered right about now if not for the suits."

"Which I told you do put on."

Her eyes are red and the exasperation is showing. Her hands are clenched in fists.

"Brae..." I plead. But she is backing away towards the pod front, dragging her bad foot. When her back reaches the navchair, she swings it out of the way, reaching up to the console.

"It won't work," I say. "We never hooked the power back on those."

She ignores me, fiddling with the dials, lashing out at the controls, banging the chair above her with the straps hanging

down, kicking the flipped circuit panels and HUD projectors. She picks up a lantern and began to swing it wildly around, looking for something.

"Brae," I caution, moving towards her. I reach out my arm to steady her wild movements.

The floor shifts below my feet and I'm caught off balance. I fall hard to my side, landing on my elbow and hip. The pod continued to roll, rotating nearly halfway back to right side up. Brae clings to the chair straps, her face curled red in anger and fear. I can hear a creaking rumble, somewhere below and behind me, deep and low, as if the very hull of the ship is about to crack. Then I hunch to a crawl, digging fingernails into the sloped flooring.

Then the rocking ceases and we roll back, the chairs and cabinet above us, lighting dangling on loose wires. Brae stops moving.

She's staring out the front porthole. From my vantage point, the wide window is black, reflecting Brae's frizzled countenance in the glare. I stand up and shamble over to where she stands, rubbing my elbow.

Her gaze is transfixed. Beyond the thick plastic composite a strange glow emanates, like the pulse of a trapped firefly. It is blurred, filtering through many meters of translucent haze. The icy cold of the underocean.

"What is it?" I ask, squinting. The light is white, but it every so often it cycles through the colors of the spectrum faster than I could register.

Brae moves her hand, the lantern swaying, spidering jagged shadows through the pod. The translucent reflection glimmers.

After a moment the distant light blinks, squeezing shut like a giant eye, reopening. It shifts through the prism rainbow once again.

"Is it signaling? Or is it just reacting to us?" I wonder aloud.

Brae flicks our light out for a second, leaving only the chain of makeshift ceiling lights. "Kill those," she says, gesturing behind her.

As I move to the switch and flick it off, my gaze is still trained on the front viewport and that distant promising light. When my wife flashes the lantern again, the light dims and disappears.

"Is it gone?" I ask.

"Looks to be," she replies glumly. Then she sighs deeply.

"Cal." She moves towards me, her free hand reaching out to caress my dangling fingers. "I'm sorry I got mad. It was out of line. We have enough to worry about without being at each other's throats."

"It's ok," I say, accepting her hand, pulling her close. "I forgive you. Let's put it behind us."

I knew there would be more fights. It was inevitable. And I feared the time when I didn't respond with sarcastic remarks but genuine rage and loathing. That would signal the friction had festered, and the walls of the divide had grown too tall.

"Maybe that light is another ship stuck own here," Brae remarks, moving over to the HUD console. "Maybe some overeager post-doc had the bright idea of following in Robert's footsteps. Ended up like us."

"If they were down here, it's possible they survived the comet blast. Unlikely, but possible. The water would certainly deaden the blast and radiation wave, especially at lower depths."

"It's probably just some robotic probe without a central HQ," Brae says. "One of Robert's lost toys."

"Speaking of Robert, he had to have seen this. His notes, there must be some mention of it in there."

"Probably," Brae says. "But is the com computer even up? EMPs fry data drives."

"Something else to add to the list. We'll work on it tomorrow," I say.

I stifle a yawn, feeling my stomach growl.

"Hungry?" she asks, her mouth twisting into a grin.

"How'd you tell?"

"Mr. Grumbling tummy here," she teases, poking me in the chest. "Let's take a look at the biosynth bed. It's probably trashed from the rough set down, but maybe it's salvageable."

We have a few kilos of rations stockpiled in storage, cold hard biscuits high in protein an carbohydrates, and terribly bland. But it would be better to save them while we have power and the chance to grow synth food.

The cylindrical bio reactor is turned upside down and the cultures have splattered the inside of the growth tubes, a thick yellow gunk of bacteria, biofilm and sugar paste. There is a good chance the cultures spoiled in the heat or became hopelessly contaminated from cracks in the growth tubes.

"Let's see what we got here," I say, focusing a hand lantern on the growth cylinder. It is bolted to the bulkhead, but easily removable. I pick up a multitool nearby on the floor and begin to detach it.

"Take out the tubes and see if you can collect most of the culture. We'll have to clean the remaining tubes."

Brae goes to work, hauling the long yellow streaked cylinders to the back room where there is a small wash closet and hose. It doesn't make sense to have a faucet in zero gravity, but it's convenient to have some source of running water. The small closet could be completely enclosed and provided two entry holes with

built-in gloves to manipulate the nozzle. Now that we were blessed with gravity, those precautions didn't need to be followed.

Once the reactor cylinder is flipped right side up and securely bolted to the new floor, I connect a fresh power source and boot it up. The chips check out cleanly and all the connection sites look to have solid, unbent mating points.

"How are those tubes coming?" I ask Brae.

"Done," she says, carrying the clean plastic cylinders back under her arms. She also holds a small clear tube of yellow and brown goop.

"It's all I could scrape out. Pretty appetizing, huh."

The biosynth growth chamber was built for zero gravity and used pressure to push the bacteria culture against the filters and cycle in food. A high-powered vacuum was required to secure the tube seal, unfortunately something we didn't bring. But now, we could simply stack the cultures on top of the filters and let the sugar water drip down. The excreted proteins, carbs and lipids would fill the trough without any vacuum cycles.

When we have the first tube set up, Brae stands back, hands on her hips. "By the time we're out of here, I'm going to be an expert in the fine art of yogurt cuisine."

We laugh together. Although the protein goop can be dehydrated into a thicker substance, closer to tofu, it was for all intents and purposes identical to yogurt. In zero-g, we just had to

mix it with our premade seasoning pouches and squirt it into our mouths. Now, with gravity, and the means to use a heated burner, we had the chance to get creative.

After scrubbing a flat metal floor panel clean, Brae balances it over the welding gun. When the pan is good and hot, she poured on the goo we she salvaged, mixing in a sprinkle of salt and pepper, dehydrated vegetables and cheese. The mixture begins to bubble and steam, giving off a pungent odor, frying onions and peppers for one, and hot cheese, but underlying it the acrid scent of burning rubber and plastic.

Brae flips the bubbling creation onto itself with a pair of flat tongs, then dumps it onto a clean metal tray.

"Enjoy," she says, cutting it lengthwise and releasing a small puff of warm steam. "Your first of many Ganymede omelets."

They are surprisingly good. The protein compound, bland as it is on its own, combines with the other flavors remarkably well, leading to a perfectly edible, if slightly chewy omelet.

As we are eating, the shadows began to flicker on the walls and bulkheads, leading from the front of the pod. Stepping into the navroom, we are greeted with a miraculous sight.

The whole window is awash in light, a veritable star field of illumination. Joining the lone light from earlier are countless companions, large and small, near and far, blinking and spiraling prisms of color.

"There must be hundreds," I say.

"Thousands," says Brae.

We stand transfixed, watching for the patterns in the light. There are waves moving through the multitude, the discrete points joining together into a cohesive body. First, a small quadrant to top port, beeping like red stoplights; then the surrounding nodes firing organically, colors transforming from seeping crimson to orange and yellow, slowly traversing the spectrum. Far off to starboard, a blue explosion of disparate blooming flowers, green petals of fire in the underocean. Lines of yellow began to connect the components in long fiery trails, only to be eaten away by square kites of ochre and burgundy. The movements are playful and alive, ever generating, never repeating.

It is over as soon as it began, each light winking out in succession, entire sections of the color map blinking to silence. The window is black before we speak again.

"Without a doubt," I say slowly, looking at Brae from the corner of my tired eyes. "This has been the strangest day of my life."

"Likewise," she says, making longing glances to the floor.

I pull a bundle of blankets from the storage locker, spreading them into the corners of the pod, avoiding the gutted pits. I will miss sleeping in zero-g.

ρ

We are exhausted. Pulling a blanket over the front viewport to cover a potential lightshow, we settle onto the floor to get some much needed rest. Brae nestles against me, and I cradled the curve of her body into my chest and legs. Under the piled blankets, we are a warm pair of bodies.

I listen to the dim whir of the fans, distant and blanketed themselves under layers of plastic molding and metal, keeping us alive. From time to time, the pod shifts, rolling with the underocean currents.

"Why are we still alive?" Brae whispers out of the dark. She is still and her breathing is deep. I had thought she was asleep.

"You mean like something kept us alive? Something beyond chance?"

"I don't know," she says. "Maybe. Yea."

"A god?"

"God," she corrects. "Do you ever pray?"

"No," I say.

"Why not?"

"I don't think it does anything for me. It's just words."

"You didn't pray when we were going down?"

I frown. I had thrown a small something into the cosmos. "Well, you got me. There are no atheists in foxholes."

"So why not now? Should we pray?"

"If you want."

She is timid now, rubbing her feet against mine. "None of the catholic prayers seem appropriate," she says. "They all seem so...earthly. So small."

It's a valid concern. The old religions were stuck in allegories of Earth, with the rising sun and the passing of days. But if history was any lesson, it was that spiritual expansion closely followed geographical exploration.

"I guess we'll have to come up with new prayers then. New creeds for a new place."

"Cal," she says, her voice childlike. "Could you pray for me? For us?"

I take a deep breath, preparing to sigh. But I hold it, biting my lip, thinking of the old intonations of gray-haired reverends in the church services of my youth, memories fading like brown leaves into the static recesses.

"God," I begin, pausing. My voice wavers, unsure, almost questioning. "If you are there, listen to us. Help us. We are two, tiny people, lost in a world we do not know. We cannot see the way forward, but we love each other very much. If it is our fate that we should stay here, then give us the strength and courage to accept that path. But if we are to find our way out, send us a messenger or a sign to light our way."

"Ok," Brae whispers, turning her cheek to me. I peck it with a tiny kiss. "Thank you for that," she says. "The prayer."

"Yea," I murmur, drifting to darkness and sleep.

σ

I dream of the setting sun.

I am next to an ocean and the sky and air are touched with orange and salmon, crimson and gold and purple, thick as blood. The clouds are low and reflect the sea, an endless horizon of gentle gradients and brushstrokes. And framed between it all is that warm half orb, seeping into the sweet earthen atmosphere, shimmering in the dying day. I can almost see myself crying, in that strange ghostly double vision of dreams.

I am sad, terribly sad and afraid. It is the sunset of my life, the end of all days. The night will be long and cold, and I will never again see the loving sun cross the sky, warm my back, tan my face. I will never again watch the blue sky twinge with the warm shades of the spectrum, watch the moon rise, still blue behind the thick atmosphere. I will never watch it with the one I love.

She is here too, somewhere in the dream. I cannot see her, but I can feel her - not her body, but her soul. There is an essence of every person inside the mind, a stored schematic that unfolds to reveal the full memory of a person. Brae. I can sense her there in my dreaming mind; that bound globe of semantic memory. It is

warm, beating and alive, a sun on its own. And I realize then, in the hazy logic of REM sleep, I will no longer have the distant ball of burning gas I call the sun. It is gone.

The one I love will be my rising sun. She will be radiant and new in morning, full of vibrancy and energy. She will burn bright through the day, feeding life and light. Then settling to sleep in the evening, simmering into passion and love and dreams.

τ

What is Love?

Where is love when I am gone? When my body breaks away, fails to beat warm blood through these long veins. When my brain ceases to churn with thoughts and dreams. When my hands cease to grasp and hold. When my heart ceases to beat. Where does the love go, what does it become?

Does it latch onto the words I've said, the promises I've made to her through my limited time here? Do those fading moments materialize into valid memories for all parties involved when I pass? Will my dreams become hers? Will my love live outside of me and dwell in her? Will it be real forever?

υ

I wake and immediately notice the cold. The blankets have been thrown off during the night, and my skin is bare. My toes are ice and my fingers blue and numb. My breath mists, a thin cloud that hangs low and dissipates over us.

Something is wrong. The life support system is programmed to maintain a steady temperature, a comfortable humidity and airflow. Brae still sleeps, curled into a fetal ball, blankets piled over her head. I heap a few more on top and creep over to computer bank, bare feet on the icy metal. The LEDs read normal numbers, programmed to the temperature and humidity I had set. But the observed temperature is off, still reading a moderate twenty-one Celsius. The machine isn't working correctly - the broken sensor the most probable culprit.

I'll need to adjust the outflow manually. With a few clicks of the small console, I start the air duct fans and circulate the heat. Holding my hand to the vent, I confirm hot air is pouring out.

How had the heat seeped out in the first place? The metal shell of pod wasn't the best insulator, but it should be enough to keep the heat in overnight. Unless there was a leak somewhere. But how was the oxygen staying in? Why hadn't we asphyxiated in our sleep?

It would be very difficult to scour every inch of the ship's hull to find cracks, especially from the inside. I could suit up and try inspecting it from the outside, but the airlock wasn't built for high volumes of water.

As far as I can tell, the pod is halfway buried in a deep shelf of ice. The forward viewport is exposed to the underocean, but a good portion of the hull, including the boosters, is encased in solid freeze. It's probably a good thing. A leak exposed to the underocean would have quickly filled with super-pressurized frozen water, immediately cracking the hull open when exposed to the air. If anything, the leak is snug against a wall of ice, trapping the oxygen but sucking out the heat. And it will slowly be melting.

I twist the ring idly.

"What is it," she says, coming up behind me. I turn and look at her. She shuffles forward, a piled tower of blankets on her back, forming a cowl over her sleepy eyes. "Aren't you cold?" she asks, gazing at me. "It's freezing in here."

"I know," I say, gesturing to the life support system. "That busted sensor, it was the thermostat. And I think we have a leak."

"What?" she says. "Should we get on the suits? What's the O2 level?"

"It's fine, it's fine. It's not draining the oxygen for some reason, just letting out the heat."

"Can we fire up the pod skin, find if there's a gap in the field?"

"We can, but not for long," I say. "I don't want to melt the ice further. It would be a disaster if hole opened up into the water."

"Not up for a polar bear swim?" Brae says, shoving off the blankets and pulling a skintight thermasuit over her bare skin. The sheer black fabric is tight on her figure, emphasizing the curves of her chest and hips. I plant a quick smack on her behind as she walks past.

"Focus," she says, catching my glance. "I'm going to take to wearing full length robes if you keep it up. Or maybe just geld you."

"Alright, alright," I grumble, pulling the heavy vacuum suit pants on. They are stiff from the cold, the inner fabric chafing. "Let's get this thing fired up."

Once we are both suited, we regroup in the navroom under the hanging chairs. "It'd be nice if we could get the pod flipped over," Brae says, shoving a strap out of the way. "I bet a short shot of the side boosters would turn us right around."

"Too risky," I say. "You know those chambers aren't meant for atmospheric use, let alone underwater. The steam would probably crack right through the chamber and blow everything right to pieces."

"Yea," she frowns. "Well at least let's take these damn chairs down. Sit on them or trash them, either way, but they simply don't work as chandeliers."

"Chair-deliers," I say.

She ignores the terrible joke and pokes around at the HUD. Most of the console lights and displays are working, having been replaced with new power nodes. A few vital figures are still off, however.

"Get a readout of the field on the big console. I want to be able to save the image, look over it," she says.

I hit a few buttons above me, out of Brae's reach. Unfortunately, the display would be upside down and would take some time to pore over.

"Join the magnitude output and vector maps, it should emphasize the weak points," Brae says, watching me work. "Ok, firing in three, two, one..."

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She hits the switch.

I hear nothing but feel a thump rip through the hull, a single resonating bass note. Brae cuts off the shield and looks at the display.

A collection of green wire-frame spheres encircle the pod, overlapping to form a complete field of protection. Along the skin itself are the vectors, encoded as backlit red arrows.

"Can you do a time capture animation?" Brae asks. "See if we can watch where the vectors fall off."

I map the transcribed data onto a sluggish thirty second animation. The vector arrows race around the hull, nesting into the crooks of the propulsion drive, the indentations of the portholes. But there is no indication of a hole.

"What about temperature readout? Did you get that?"

I hit a few buttons, pulling up a mottled field of blue, yellow and orange. "The shield wasn't on long enough to really heat up the surrounding water. The steam bubbles dissipate too quickly. This is deep ocean, with strong currents."

"Do a thermal difference between now and the shield burst. Amplify the values," she says.

The computer crunches through a few scripts, finding the statistical averages of the temperature zones for the respected timestamps. I put the resultant image up on screen.

"There," Brae says, pointing at an indiscriminant pixel on the lower bow. "Zoom in."

I pan closer, expanding the tiny point into a small bubble of red. "A heat pocket."

"Can we get a visual on that area?" she asks, looking over the console controls for the cameras. "Snapshots still out?"

A few are," I say. "Some were damaged in the crash, busted lenses and whatnot. I think the primary bow lens is functional. See if you can angle it downward."

Brae pulls up a rough video feed from outside - an opaque line of brown and black.

"Are the lights on?" she asks, squinting. "I can't see a thing in this."

I up the contrast and fire the forward lamps. "Now?"

It is still little more than a bland sheet of ice, endless foggy water in the peripheral. "The pocket must be buried in the ice." I say. "We're losing heat but it's trapping the air."

"But wait," Brae says, eyeing the camera feed. "Look where that lens is placed. Only half a meter above the pocket. There must only be a few inches of ice remaining. "

"Not good," I say. "We need to seal that hole. We have any hull patches?"

"Don't think so. They didn't fit, remember?"

"Damn. That case of champagne we were bringing Robert," I say. "Well, we can improvise. Let's take a peek."

"I'm going to kill the heat first," Brae says, zipping her suit back up. Even without helmets and pressure seals, the suits will

provide warmth. Unfortunately, the access shaft is very narrow and difficult to maneuver, especially in the suits.

Once the heating fan cuts off, I can immediately feel the seeping cold. Ducking down into the shaft, it's even stronger - no wind or blowing precipitation, but a ghostly pall, settling thick into the shadowed corners.

The last few meters I have to get on my belly and crawl, surrounded by piping and black metal paneling. At the far end, where the shaft runs into the hull, I can see it. The gleam of ice.

It is thin and moist here, barely collecting beyond the seams of a loose water pipe, but it was very much there. Ice, encroaching into the pod.

I pull off my gloves, holding the light in one hand and feeling with the other, following the dropping temperature to a crack in a panel, down and out.

My knuckled brushes past a jagged edge of metal, then something burning cold. I withdraw quickly, but that's it - the bubble out into the ice, the tiny opening that will draw our very lives.

"I found it!" I shout to Brae. "I'm coming back out."

When I've scooted back out of the narrow passage, I take a look at my hand. The broken metal has ripped through the numbed skin, peeling off long pink strips from my knuckles down. Tiny

crystals of ice sprinkle the wound, rapidly melting in the warmer temperature of the pod. My hand is completely numb.

"Ewww, babe," Brae says when she sees me, cradling the wound. "Let's wash that out."

Some of the crystals begin to fog, a surefire sign of frozen carbon dioxide - dry ice. I brush off as much as I can before running it under water. Any crystals buried under the skin or floating through the blood will rapidly expand into gas, rupturing the flesh. Even so, my hand grows extremely sore as it thaws.

"Wear gloves next time," Brae says, bringing a clean white bandage for my hand.

"Can't," I say. "I won't be able to weld with those things on. Just gotta be careful."

Brae holds up the thin metal sheet that had comprised the side of a cabinet. "Will this work?"

I look it over. It's large enough to physically cover the hole, but strength is another issue. A single layer of metal would continue to conduct heat and melt the surrounding ice. As soon as the pocket breached into the underocean, the pressure of millions of tons of water would be on the seal. Even if the metal held, it might bend and still spring a leak. The best option would be to fit two plates outside the hole so the outer pressure would merely push tighter. This would be difficult, given the angle of the hull wound and the extreme conditions outside.

"Let's get a few more of these," I say. "We'll need to cut them down in quarters by my estimate. Then we need a handle of some sort." Brae went scavenging.

Utilizing the handle, I would push the plate outside of the hole. Once the two plates were in place, I could weld them against the outer hull. Finally, I'd put another patch over the entire thing, attaching the handle by a crossbar to the inside of the ship.

It takes a good portion of the day to arrange the materials, slowly cutting the sheets with the torch, affixing the handles through the plates with bolts and epoxy, crawling back down in the trench to eyeball the pod wound.

I remove the side panel at the far end of the crawlspace for better access to the ice pocket, exposing a nest of wires and piping. Cautious of electrical shorts, I tape them up against the side of a large vent tube, setting my lamp in the resultant nest. Now I can work with both hands.

Not wanting to risk frostbite, I pull on my gloves to position the first outer plate. At an angle, it passes easily through the hull wound into the pocket.

Positioning the plate is a bit more difficult. The ice has encroached on the hull, melting and refreezing, preventing a snug seal. I have to scrape the plate along the outer skin, crunching off large chunks of frozen water and CO2. Fog begins to seep from

the pocket, filling the crawlspace with white haze. I have to work blind. It's difficult to breathe.

When the plate is snug, I push the second through. It's even more difficult to position then the first, and impossible to verify in the smoke. Working by feel, I crunch it against the walls of the ice pocket to properly seat it, scraping off even more dry ice in the process. The CO2 fog is choking, cold and cutting into my oxygen. Blinded, I pull off my gloves to verify the seal, running my finger along the seam of the two plates. When I feel a gap, I adjust the handles and try again. By the second pass, my entire hand is numb, the fingers solid and unresponsive.

"Here goes nothing," I mutter, wrapping the twin handles with a strip of epoxy tape to secure the plates for welding.

I pull on my goggles and fire up the torch, the blue flame scattering the light in the fog, like distant heat lightning on a warm summer's eve. Sparks fly like tracer bullets, deadly projectiles through the mist as I melt the metal together, a few bouncing off my exposed hands and forearms. They will leave scars, but I am too frozen to notice.

The metal begins to heat up, and I have to release the handles momentarily as I weld them together, burning through the tape. The jagged edge of the hull wound comes next, and it's difficult to weld the bent metal. It is a makeshift job, and hopefully the double plated seal will hold.

By the time I secure the final plate in place, covering the hole, and bolt the handles to the crossbeam, I'm near unconscious from oxygen deprivation. Brae drags me out by my feet, and I slowly clamber out of the crawlspace, coughing up fog and dust.

"Done?" she asks, wiping the sweat from my brow, damp hair stuck to my scalp.

"Done," I gasp, blinking up at her. I am exhausted.

ω

She wraps a blanket around me, bringing warm water to wash my hands. I want nothing more than to fall into deep sleep. I shiver despite the surrounding warmth.

"We should be safe, even if the pocket cracks and lets in the water. It's a double plated patch..."

"Cal, don't speak," she says, putting a finger to my lips. "Just rest. You need the rest."

I close my eyes, feeling her hands across my forehead, gently brushing my hair.

Long minutes later, when I hover on the edge of sleep, I feel her crawl under the covers. Her legs are bare, the curve of her hips and breasts wrapped in the sleekest satin piece she has brought - a purple slip fit for royalty. The warmth of her body transfers to mine, the smooth length of her legs coiled like snakes, the soft hump of her behind molding to my lap; the petite bump of her

shoulder blades pressed to my chest. I plant a kiss on her neck and finally fall off into unconsciousness.

I dream of the moon, the ice and the underocean, and the pod trapped beneath.

I see Brae and I as tiny trapped souls, scurrying about like doomed mice. We sweat and bleed in our tiny tomb, wracking our minds to fix the multitude of traps and dangers. We are alive, but I can see how we are being worn down. The emotional and mental scars are manifest on our bodies.

It is wrinkles and gray hair, subtle first, like the slow horrid truth of aging. It is only the thinnest veneer, but when I examine the face of my wife I can see it in her eyes. There is a sadness perpetually dragging on the corners of her eyes. The color is fading, what was once a regal lightning azure draining to an old baby blue. Her eyelids are drooping, long lashes graying as well, falling out and seeping away with her tears.

The glory of her young body - decaying. She sags and wrinkles, the perk of her chest deflating to old leather wine sacks. The curves became misshapen, lumpy and old, the skin mottled and rough.

I too suffer the effects. A balding head, haggard muscles, hunched posture. I can do nothing but sit in a makeshift chair and stare, waiting for the nightly underocean fireworks.

They will come as scheduled, the distant bubbling lights, the flickering prisms of color. And then closer, silver streaks forming webs between the glistening nodes, flashing red and orange and green and purest white. My old eyes twinkle and I watch as a tear forms, round and clear and pure enough to reflect the colored spectacle in its salty curves. Then it drops away. Brae's tear ducts have long since dried up, but as she watches the undersea lights, eyes growing red and puffy, I can tell she was weeping.

This will be our fate, a life of imprisonment, rapt in wonder at an alien spectacle that will never make sense to us. We will watch it our entire lives, following the patterns hidden within the dancing lights, and it will fade, like youth and tears and warmth. We will die in here, unknown and lost, a life of unfound promise, fading dreams.

ξ

She is shaking me. I slowly emerge, still buried in the heavy tendrils of dreamsleep.

When I see her youthful smile I almost began to weep. She is here, alive and well, not a single wrinkle or mar on her face. I prop myself up, running a hand along the length of her skin, marveling at smoothness. She bends forward and kisses me.

"Good dreams?" she asks, standing. "Come on. The lights are starting." She moves to the navroom without waiting for me

Her cheer is palpable. She knows nothing of my subtle nightmares, but they haunt me as she shuffles to the navroom. She has detached the navchairs, affixing them with bolts to floor. She sits down on one, props her feet up and leans back. "Best seat in the house," she says. "Come. Sit."

I settle next to her, the same as the dream. The lights are just beginning, the faint speckles of activity. I marvel anew at the glorious color, the bounce of the signals, like communication in a gargantuan web. As the underocean roils beyond our screen, I hold out my hand, palm up.

She reaches over, delicate fingers interlocking with my numb tips, a chain bridging the gap. That act of small solidarity gives me hope.

Part II: Ice

α

My fingertips are turning black.

Brae looks at them, gently turning them over, examining the dying flesh. The nails are cracked and peeling, the skin over the bone crusting away, like a burned pastry.

"Frostbite," she says. "We'll have to cut the tips off."

I grimace.

"Don't be a baby. It's just the first knuckle. You'll still be able to use your hands. And when we get back, they have wonderfully realistic prosthetics, manicured nails and everything."

"At least I won't have to trim them anymore."

She smiles. "Be thankful it's not your face. I can live with a man with paws for hands. No nose, that's a different matter." She digs through the makeshift cabinet we have assembled in back of the pod. "Here," she says, pulling out a long knife and a first aid kit.

I shudder at the sight of the big blade. Brae riffles through the kit, selecting bandages, a few needles, surgical epoxy, and a small labeled bottle.

"Local anesthetic," she says. "You won't feel a thing. Put your hand up here." She motions to the countertop of sleek polished metal. "Spread your fingers wide."

I do as best I can. I still can't move the tips, but they tingle as blood attempts to navigate the damaged vessels.

Brae selects the smallest needle and attaches it to the large syringe, filling it with the dark liquid. She holds my wrist as she injects it into my left hand.

"You won't move, will you?" she asks. "I don't want to slip and cut off more than I should." She grins evilly at me. I pale.

"Maybe you should tie my hand down. Or something."

"Smart thinking, hubby." Back in the closet she retrieves a roll of tape and a small countertop vice. "Hold it up here before the painkiller wears off."

She wraps my wrist with the strong mesh tape, securing my entire arm to the vice. Then she bends the pinkie, finding the joint and the place where the dead skin meets living.

"Don't watch," she says, bringing the knife down.

I can't feel pain, but can feel the pressure of the blade on my skin, moving cleanly through flesh until it hits bone. She tenses her arm, breaking the joint with a sudden jolt.

"One down," she mutters.

I glance at my hand, morbidly aware of my own finger, now sans a blackened joint. With a quick twist of her thumb, she pulls the flap of skin over the wound and seals it with surgical epoxy. Then she shoves the dead fingertip to the side of the counter and moves to the next digit. My ring finger.

"You're lucky," she says, bending the tip. "That you didn't freeze more. You'd have to find a new place for the ring."

I nod, grimacing as she slices through flesh and bone. A tingle of pain travels down through my hand, up my arm. My index and middle fingers are more damaged than the others - these were the ones I used to find the seal in the hull patch. Brae has to remove two joints.

I swallow a scream as she snips off the index knuckle. The anesthetic is wearing off and the second knuckle is for the most part alive. A spurt of red streaks the smooth metal when she moves the knife blade. Unflinching, Brae takes a dab of surgical epoxy and closes off the hemorrhaging artery. I grit my teeth, the entire digit aching, pulsing fire.

She moves on to my thumb. "Not too bad. I'm just going to shave off a bit of skin, I don't think we need to amputate." Using a smaller knife, she carves off the blackened tip and a bit of nail. But she hits a nerve and I yelp, pulling away, my butchered hand rattling in its bond. A thick chunk of blood seeps out as she fills the wound with glue.

"Halfway there," she mutters, taping down my right hand and injecting the drug. I am sweating, the muscles of my arm and back aching from the constant tensing and release.

By the time she is done, I am slouching in my chair, my arms pulling hard against the tape. My hands look like the bloody

aftermath of the grand inquisitor's torture chambers, and a small pile of excised knuckles stands black and ugly, testament to the butchery. The metal countertop is smeared with brown drying blood.

"Rest," Brae says, looking into the first aid kit. "Take these pills. There's an antibiotic and a painkiller. The pod should be pretty clean, but you never know. I've heard of old microbes buried in the ice of Europa."

She holds the glass to my mouth to get a swig of water. I swallow painfully.

"Don't touch the wounds. I'm going to wrap them. The epoxy might get itchy, but don't touch it, let it heal on its own. The skin flap might come loose on some of these, I'm no surgeon."

Before she removes the tape, she wraps my fingers in bandages, then my entire hand in a white sheet. I slump away, a tingle of feeling extended from my amputated digits. I can still feel them, phantom fingers cut away in the cold.

I dream of playing the piano, typing furiously, strumming a guitar and filing my nails.

β

I manage to pull up the pod's data drive. Pecking around with my bandaged nubs, I extract what's left of the drives onto the console memory. It is a tedious process. The large data drives are

magnetic-based, storing the digital information sequentially, a long chain of positive and negative values. The EMP damaged parts of the chain, rendering a straight read impossible. Only by painstakingly transferring the bits that were correct to the central flash drives can I begin to access the data.

There are still holes, of course. Files that had been compressed are outright unreadable - the compression algorithm prevented a sequential read of the data. But straight binary data is salvageable - for the most part unprocessed images of the planet and moons, the latest public net encyclopedias, and Robert's journals.

I browse through an account he took nearly a month before our arrival. His entries are short and terse, recording the mundane events of the day, new pieces of research, explorations into the underocean. But occasionally, he branches into the realm of speculation, theorizing the nature of possible life in the ice. His musings are fringe, perhaps extreme, but often profound.

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Robert's Journal
Initial Exploration

Took a temp reading today at ten kilometers. Pipeline froze retrieving recording device, forcing cut of cable. Jupiter rising on

horizon. Plasma halo is highly visible, especially when backlit by sun. Looked over latest Europa reports.

A set of communicating discrete nodes is the basis of the Europan life form. Each node is perfectly alien, a secreted silicon crystal bouncing light along distinct angles. But theoretically, this is no different than the neural cells of the human brain. Electron potentials move across cellular gaps via neurotransmitters, chaining the initial signal and in turn, encoding for the resultant emergent behavior of thought and feeling. So, too are the light patterns beneath the Europan seas - transferring of distributed information across information gaps via an outside agent, in this case, heavily refracted light through water.

It remains to be seen whether Ganymede shares similar life forms. However, I made a very interesting discovery. The deep diver probe brought up silicon crystal from a selection of water samples at varying depths. Upon examination under microscope, crystals appear to be organic in origin, owing to the curved, narrow "secretion points". I have requested microscopic scans of Europa's crystalline structure for comparison.

Much is still unknown. How do the crystalline nodes metabolize energy and reproduce? I have speculated the light chains are an important part of the nodular energy source. The silicate organelles could simulate a process similar to

photosynthesis, chaining polysilicate molecules with an analogue of the electron transport chain.

At best guess, the nodes spontaneously emerge from the surrounding underocean water, growing in crystalline structure when struck in the path of the photon chains. Of course, spontaneous generation is not scientifically sound, and an appropriate vector must be attributed. Perhaps existent silicate particles are catalyzed by specific light chains, resulting in a new node.

Death is yet another question. There is certainly the possibility of environmental damage. Water molecules may enter a fissure in the crystal, freeze and crack it apart. Excessive heat, in the case of underocean volcanic activity, can also destroy the crystal nodes. No aging process is apparent.

In my research, I am reminded of the early explorers of the microscopic realm, Hooke and Linnaeus and Leeuwenhoek and all the rest. My peers and colleagues have sunk their heads into the realm of the theoretical, constructing explanations for what has been seen and known for hundreds of years. But I am in a pristine new realm, seeing it first with human eyes. There is a profound joy in this, to watch the movements of unknown wonders of the universe, to ponder that which has not yet been imagined in the minds of men.

I can only hope my feeble grasp will be but a tiny foothold for those who come after me, journeying into this new realm of human knowledge.

δ

The adrenaline of survival has drained from my blood, and I am growing weary.

The pod throbs with a dull energy, the pulsing light of the swaying lamps, the cycles of the heating fans, the steady drip of the biosynth chambers. And every evening, before I turn in for restless sleep, the fireworks of the deep.

At first I watched them with curiosity and hope. There was so much promise in the mystery. What were they? Were they sentient? Could they communicate with us? Did they hold any hint of salvation?

But no. They are no more than a geographical anomaly, minerals buried in the frigid waters of the underocean, reacting with the magnetic fields and decaying radiation of the comet.

And Brae is worse. She turns inside herself, nose sniffling with some latent cold. She is weary as well, but the emotional drain manifests in her person, her lethargic movements, her lacking conversations.

It was only days ago I found her huddled under her tented blankets, eyes red with tears.

"What's wrong Brae?" I said. "What's the matter?"

"Cal," she said, shaking her head. "Oh, Cal. Why are you so good to me?"

"Because I love you," I said, feeling the heavy words leave my lips.

"I don't deserve it," she whimpered, a tear collecting in the corner of her eye.

"You do," I said, wiping away the moisture, letting it seep into the skin of my palm. "I love you, and will always."

She sniffled. "We're going to die down here."

I didn't say anything.

"There's no way out, Cal. We're going to die down here. In this pod, this crashed ship. This tomb under the ice."

"Maybe," I whispered, drawing close, pulling the blanket over my head. I kissed her deep and hard, tongues battling like coiled snakes. Slowly she pulled back, a sliver of saliva chaining our red lips together, gleaming as it broke and fell away. I moved my mouth to her ears, nibbling the delicate lobe. "But I'll love you to the end.

We embraced then, and I felt her hand running down my chest. I reached for her, finding the curve of her breast, the soft hollow of her waist; the firm rise of her hipbone. And then between her thighs, warm and wet and alive. Her legs locked behind my lower back, pulling me closer, into the heat.

Her eyes closed, forcing out the remains of settling tears. I watched as they ran down her cheeks, becoming joyous as the pain and anguish melted inside. Her lips formed a slow smile.

My face between her breasts, she whispered in my ear, "I'll love you."

I looked up, watching her face contort in lovely twitches. "To the end?"

She giggles, fingernails raking across my bare back. "Yes, Cal. To the end."

ε

After, she rolls over and looks me in the eyes. "Do you ever think we should have waited?"

"What?" I mutter, dazed in the afterglow. "Waited for what?"

"To get married," she says.

I hesitate. It's a loaded question. I decide to stick with honesty. "Sometimes."

"Really? You didn't think it was exactly the right time?"

I shrug. "I'm happy."

"With the way things turned out?" she chuckles. "With all this?"

"Hah. Well not the crash landing and all that. But with you. I'm happy."

"But what would you have done? If you had waited?"

"More schooling I suppose. I always thought in the back of my head I'd get tenure in some little northeastern private school. Lecturing, getting lost in research, acting nervous around the pretty grad students."

"Pretty grad students, huh?" she says, smirking. "Like *maw*?"

"Yep," I say, tickling her ribs, up under her arm, grabbing her as she twists away. "Looks like I found one. And what about you? Where would you be without me? If the timing had been different."

She raises an eyebrow. "Probably stuck on some crazy moon with a mad scientist."

"Funny how as much as things change, they stay the same," I say. "Remember that time you stayed up all night cramming for that orgo test, and I came over with the Chinese takeout."

She pokes me in the ribs. "You gave me food poisoning! I missed my entire exam, had to retake it. You were so sweet though. Keeping my hair out of the toilet when I was puking my guts out."

"Fun times," I murmur.

"Remember that time you asked your Dad tossed you a pencil, you ducked and it got stuck in your forehead?"

I laugh, reaching up to feel the tiny scar where the lead had embedded itself. The luckiest pencil toss in the short history of the deadly art.

"What about the time we squeezed into your tiny car to make out, parked right down the street from my parents house? God, that was awkward. I kept thinking someone was gonna knock on the fogged windows, take snapshots of us."

"Weren't those the days?" she says. "Sex was such a taboo, such a new thing for us, and we had to hide it from everyone. But we did it in the craziest places!"

"The tent on that camping trip with all your undergrad friends," I say. "Sharing sleeping bags."

"The hotel room on the ski trip. Everyone was passed out drunk on the floor, and you couldn't keep your hands off me."

"Not as bad as the drive back. If I remember correctly, you couldn't keep your hands off me," I remark.

"Guilty as charged," she says, sliding her warm hands past my navel, tickling my waistline. Her touch induces shivers. I hug her and kiss her on the cheek.

"Hang in there, girl. It's going to be alright."

She hugs me back and her breathing grows deep. Her grasp gradually weakens as she falls into sleep, her hands gracefully sliding away. "Goodnight," I whisper, smiling small. It is a victory, if only for a day. Turning her despair into happy memory. For that, I can join her in peaceful slumber.

ϕ

Is there a way out?

That has been the question lingering in the back of our minds for months, ready to leap screaming from our tongues, but held back by fear. Fear of the implications. Fear of the possible answers.

Is there a way out? Most probably no.

The ion booster is useless underwater. The communication broadcast range is hopelessly limited, the electromagnetic rays swallowed up in the uncountable molecules of the vast underocean. And even if a mayday message was successful, what then? A rescue would be an exercise in futility. Our location is unknown, even to us. And the pod? Buried under many kilometers of ice and freezing water.

What is left but despair? What remains but the solemn realization of doom, the days marching in unchanging array without a destination? Without a positive outcome.

And yet, there is still that miniscule sliver of hope, the edge of mystery to be unraveled. There are so many beautiful glories in the world, even in this place. The blue twinkle of Brae's eye in the fading light. The warm embrace of sleep, and dreams. The trove of knowledge buried in Robert's journals. And the lights of the deep, brilliant in color and fury.

Are they the same as Robert's Europan crystal nodes? Are they built spontaneously, catalyzed from the light and the very

brine of the water? Or are they something else, yet another analogue, an alien mirror of that very life, just as momentous and complex and vast?

Is there a way out? Perhaps. And if any secret lies hidden within the Creator's twisted imaginations, the light of the underocean would be as good a key as any.

γ

Brae fixes cups of steaming tea and sits beside me on the navchair. I am still picking through another of her experimental dinners - grilled tofu in a spicy noodle sauce. It's not bad, surprisingly edible despite the soggy noodles that melt into a goopy mush. The habanera pepper extract from storage clumps together, leading to bites of fire interspersed with bland.

We have begun to ration the seasonings to once a week, leaving the daily meals to standard gruel.

Beyond the porthole is bleak, and we have the rare chance of uninterrupted discussion, undisturbed by the light show.

"The com," she begins after a long sip of tea. We've been recycling the leaves for over a week, so the warm drink is weak and tepid.

"The com," I repeat. "Is not effective. We've sent out messages weekly."

"Then lets continue," she says. "No use breaking from tradition."

I frown. "Fine. If that's the first order of business, it's easily accomplished."

With a few taps on the console, I bring the interface up on the HUD.

"Same message?" I ask, pulling up our standard template:

Cal and Brae Solman, attached with Robert O'Connor's Ganymede exploration, requesting assistance. Trapped beneath ice. Supplies, power good. No injuries. Last known cords: lat 25 long 18 on 11/1

She flicks her hand petulantly, turning away. There had been jokes in the earlier broadcasts, pleading for the latest celebrity gossip, video games and alcohol. But they fall by the wayside when the com became a weekly chore.

The console beeps once and minimizes to a single green dash, empty.

"What's next?" I ask, wondering about the data streaming out from the pod at the speed of light, only to be swallowed up and absorbed in the sea above and around us.

"I switched the middle synth chamber to produce more sugar," Brae says.

"Have a sudden sweet tooth?" I ask. "You know those are calibrated for the optimum nutritional requirements."

"For two adults," Brae mutters, looking down into her cup of tea.

"What?" I peer closer, leaning out of the navchair.

My wife sighs deeply, setting the mug on the makeshift table beside her. "Cal," she begins, fidgeting. "I haven't had a period in six weeks."

"Are you sick? The radiation could have knocked your cycle out. Or the stress from those first days."

"No," she says, pulling a handful of sticks from her jumpsuit pocket. "I took the test. Four of them in fact."

"Four?" I reach over and take one from her, staring at the tiny screen. There is a plus for positive. "I didn't even know we had these. Why would they be included in the standard pod first aid kit?"

"Cal," she says, stopping my delirious babble. "I'm pregnant."

"Pregnant," I echo in a whisper, biting my lower lip.

"We're going to have a baby, Cal."

"Wow..." I am stunned. "How? What about your birth control, Brae?"

"I stopped taking it, Cal. I didn't see the point, trapped down here."

"Didn't see the point?" My voice is rising. "How could you not see the point? The entire purpose of the damn pills is so you

don't end up with a child in a god-forsaken place like this. Do you realize it's hard enough for us to survive down here, let alone with a little baby?"

"Well maybe if you weren't such a hornball," she says, arms folded.

"I'm sorry for having needs," I say, standing. "And don't tell me you didn't enjoy it as well, Brae. I know you. You lust as well. And that's perfectly fine. But this," I say, louder, holding up the testing stick, "is not, Brae."

She rises and snatches it from my hand, her face twisted in anger. "I'm sorry then, Cal. It's all my fault. All of this, the crash, the EMP, my own damn uterus. I'm sorry I ever followed you."

She tosses the sticks to the ground, stomping them as she marches past me to the back of the pod. As she moves past, her raven curls billowing out behind in the half-gravity, I see the single tear making its slow journey down her cheek.

"Brae," I shout after her. "We need to think this through. We need to be logical about this."

I hear her return a muffled cry. "I'm sorry. Leave me alone, Cal."

I twist the ring, feeling the grooves in the side, sitting heavily in the navchair. An angry pregnant wife. And soon to be another. A child.

I take a long sip of lukewarm tea and stare out the porthole, into the endless frozen black.

η

What is Love?

When I say that I love her, am I saying it more for myself than her? Do I need to reassure myself of something, that elusive figment? Can I even put a finger on it? I have so much evidence, empirical facts to back it up. I can prove it. The sacrifices I've made, the vows I've recited, the feelings that have burned, deep and intoxicating.

But where is it? Love. Where does it live? Where is my heart, if not my mind and words? Where does it go when the anger surges, and I can't help but feel annoyance, or weariness, or dream of a different life? Where does it go when I want to seep into a reclusive hermitage, care only about myself, forsake all others? Where is love?

ι

Robert's Journal
Astronomy and Myth

Ganymede was the cupbearer for the gods.

He was the most beautiful of mortals, a man with golden hair, a prince among men. Zeus looked upon him and lusted after him. Typical of his nature, Zeus could not control his passions. He took the form of an eagle, swooping down and carrying Ganymede off to Mount Olympus. Or so the myth goes.

Yet to understand the importance of the planets and the moons, the stories of their namesakes are equally important.

The ancients knew of five planets beyond their own - Mercury, Venus, Mars, Jupiter and Saturn. Mercury was a merchant, swift of thought and quick with money, so he became the tiny hot planet, closest the sun.

Venus was the goddess of love, a bewitching nymph of virgin purity. She was green with lust and life, and thus became the second planet, hazed with boiling chlorine gas.

Mars was mighty and strong, a warrior drenched in blood and pain, ever red. And so the fourth planet, a faded ball of red plains and rock.

Jupiter was the Roman analogue to Zeus, king of the gods, lord of thunder, father of them all. The fifth planet would be his personification, larger than the others, swirling with monstrous storms.

And behind it, Saturn, Zeus's father, ancient and distant, a Titan. One of the creators of the world.

The Greek civilization faded, and after it the Romans, but still the names persisted, till the schema was adopted by the scholars of the west during the renaissance and enlightenment. But why? Why did the names persist, and with them the symbolism and story? Why not simply label them as the distant stars, with serial codes, a logical system of letters and numbers?

Galileo attempted something similar when he discovered the four largest moons of Jupiter, simply attributing them roman numerals (and then gifting them to his Medici sponsors). Yet it was Simon Marius, a German astronomer that gave them the names that stuck - the names of the lovers of Zeus. Io, Europa, Ganymede and Callisto.

As typical of Hellenistic myth and legend, lovers were fated to hardship, to tragedy, to lives outside of their will.

Io was the daughter of a river god, a lowly maiden who caught the fancy of Zeus. In his lust, he transformed her into a white cow to hide from his jealous wife, Hera.

Europa was a Phoenician princess, another object of Zeus's eye. He transformed himself into a white bull (perhaps in tribute to the Io tale), and kidnapped her on his back. The constellation Taurus is a permanent monument.

Callisto was a nymph, found bathing by Zeus, who had taken the form of Artemis, the great huntress. In her natural state, Zeus

saw she was with child and became furious, turning her into a bear. Ursa Major and Minor play out the story in starry grandeur.

And then Ganymede, taken away in the talons of an eagle. He too lives on in the stars, as Aquarius.

They are fitting names, given their orbit about Jupiter. For love in the ancient myths was not reciprocal or balanced. Zeus's offspring were more the result of nonconsensual rape than loving procreation, and so too are the destinies of the Galilean satellites - rapt in gravitational slavery.

It is a tenuous breach to find any hint of those myths on this frozen moon. The winds and the snows never cease, burying me under endless mountains of powder and crystal, white and gray.

Yet for a man with a telescope on a warm Italian night, a mere boat ride from the birthplace of these timeless tales, I can see how the names would be fitting.

φ

Brae pulls a dark sheet over her new sanctum in the storage room. She hides from me, shadowed silhouettes behind the sheet, the curve of her form veiled from me. She doesn't speak, only grunts in mild acknowledgment of my inquisitions.

She eats alone, salvaging her rations of carbohydrates, sugar, protein and fat from the synth tubes while I sleep, read or focus on the lights.

It is a dismal relationship. There are glances in those moments between, when I catch her rising from the tubes, hands shiny with yellow extract, or emerging from the steam shower. She watches me with dead eyes, seeing but not feeling.

I open my mouth to speak, perhaps to voice an apology, but she clenches her jaw and turns away. I am not even granted redemptive tears, a hint at some possible reunion. Only cold loneliness.

So I turn inward to my studies, watching and thinking and reading. There is much to learn. Robert has left me many pages of journals. And there are the lights.

In the interest of scientific inquiry, I have made some observations. Initially, Brae and I approached the lights as mere spectacle - akin to a glorious sunrise or the peak of a mountaintop, breaching the cloud layer. But as the initial wonder subsided, the tourist in me gave way to the empiricist. The lights were a natural phenomenon, and thus could be explained by natural laws. And since nothing of the sort had been discovered before, that revelation could lead to yet more truths of reality.

First, the lights are responsive to stimuli, namely, directed light. They don't simply sit there, blinking on and off at random.

Brae and I hinted at this on our first observation, when our lamp beam stretched out into the dark abyss and fired off that first glowing dot.

I've since grown to calling it Alpha, for it was first, and appears to start the lightshow every night. Alpha's initial monochrome blinking sets off two sets of lights - beta and gamma. These are sprinkled throughout the underocean at varying distances, but they share a common color. Beta begins a light yellow, barely tinted from white, but moves darker and hotter, into orange and red. Gamma is similar, but moving blue to purple. Chains of light connect the sectors, which is how I've identified them. So far, Beta is composed of twenty-two nodes, gamma fourteen. I suppose there are nodes out of sight from the pod that may play heavily on the pattern. I've yet to tell.

From Gamma sprouts the Tree Formation, an organic green pattern of lights that extends up and outwards. In places, the 'foliage' is incredibly dense, possibly comprising hundreds or thousands of nodes, but the pattern itself is fickle and dissipates randomly.

Beta also catalyzes a number of tertiary pattern chains. A spinning red globe - Clown's Nose - fires up deep to port after Beta has run through a number of cycles. Racetrack slings around the perimeter in red and blue streaks. And the Minnows, a set of

tiny lightning bolts that scurry beneath the Tree Formation like a school of tiny fish.

The lightshows are different from night to night, varying in length, intensity and shape, but the same archetypal elements always return.

κ

I see her in slices of time, thin and fleeting, backlit by flaming overblown lighting.

Her back, fragile and smooth, the lines under the flesh, ribs and spine curving down and away.

A twitch of her hair, blown by the autumn wind, flaring up with the haloed crimson leaves.

The regal snap of boot heels on marble, prim marching in a brown woolen suit. I miss her.

I have not told her I love her in days. Yet the guilt is draining away and my tongue catches behind closed jaws.

λ

Roberts Journal
Thoughts on Life

What is life? When does it start and where does it end? How can we know what is and is not alive?

The Europan nodes bring these questions and more into a new light.

Cellular organisms are nothing new. Earth is full of them, from the lowliest paramecium to the largest sequoia. But those living things are easily delineated, cleanly separated from the environment that surrounds them.

What of the fungus that stretches miles beneath the earth, long single-cell strands crawling into the decaying organic matter? Is it a single living thing, or a colony? A single cell may survive on its own in a damp, dark smudge of dirt, but it will not reproduce without specialized spore cells. It will die out, the same as a blood cell, bacteria in the intestine lining, the flagellum of a paramecium.

And what of ants? They are a single organism in the tomes of all biologists, yet they are tied forever with their queen and colony. Specialization has divided them into drones, mating males, and queen. They are intricately entwined, and each could not survive without thousands of others. The queen requires drones to build her a nest and secure food. Mating males provide sperm, the genetic pair for her thousand-egg brood. If some terrible twist of nature removed the mating males from the immediate vicinity of

the queen, the entire colony would die out. Should we not, therefore, consider the ant colony an entire multi-cellular organism, much like the fungus?

What of coral, who craft massive undersea mountains on the bones of their ancestors? Yet it is the structure - the nooks and crannies and hiding places- that attracts a multitude of life, bringing with it a trove of organic detritus. Food for the coral. It is all interconnected. If a single coral cell dies, the reef will still flourish, growing from that tiny carcass. But if the heaped and frozen bone is damaged or destroyed, lifeless at it is, the coral dies with it. Where does the life begin and end?

I see the Europan nodes in much the same way, a network of crystalline structures spanning the deep frozen seas of the Jovian moons. There is no limit to their growth. Natural predators are nonexistent, and environmental factors only come into play along the fault lines.

Like the ant colony and the coral reef, the Europan nodes hang in tenuous balance between thriving growth and utter annihilation. I hypothesize they draw their energy from the underocean vents, harnessing the thermal energy to produce visible light, which they broadcast outward in direct paths. These nodes are specialized, the "queen" of the nodes, able to withstand the heat and create a chain of energy to power the entire wondrous network.

Yet with a single surge of superheated steam and gas, the crystals will melt, the silicate structures disintegrate, and the entire colony will go dark forever.

μ

I go to her in lust.

Peeling away the makeshift curtain, she is snuggled into herself. Her face is drawn, stained with streaks of sad moisture and nervous sweat. Her hair is snarled in black tangles and knots, lopsided and jagged. She looks up and sees me, licks her lips.

"Brae," I say, hunching down next to her.

"Yes," she says, her voice cracking. I put my hand on her shoulder, rubbing it along the curve, up her neck, down her back. She leans in, accepting.

I pull her under the blankets, unwashed and warm, fuzzy with lint on my arms. Then I'm peeling away her top, spilling free soft lobes. She resists at first, a whining sad cry. Her face is buried in the crook of my arm, nibbling the bare flesh, kneading it wet with her lips and tears. I'm finished in a handful of fervent, strong strokes.

After, I roll away, tucking her back in the blanket.

"Cal," she whispers, her voice barely escaping the confines of her den.

I turn to her, silent.

"I love you," she says. There is a pause, as though she is waiting for something.

I let the curtain drop.

ν

I remember the first time she told me those words.

We were earthside, after exams, the beaches of her home. The east was plagued with a string of protests and power outs, and she convinced me to spend a warm summer on the west coast, soaking in the sun and slowly getting to know each other. I accepted nonchalantly, figuring a few leisurely months would prepare me for another semester on the elevator.

"I'm not going back," she said one afternoon, over a cup of tea. I remember what she was wearing - a tight fitting gray t-shirt and jeans, an Eiffel Tower pendant beneath.

"Where?"

"Next semester," she said. "I'm not going back to Elevator. I'm through with living up in orbit."

I raised an eyebrow, studying her. She was waiting for me to react, slowly sipping her mug to cover her mouth. Her scheming was palpable, and soon she noticed my suspicion and chuckled. "Well, don't you care?

"Maybe."

"You do care, don't you?" She set the mug down and punched me across the table in the shoulder.

"Well, what are you going to do then?" I asked, rubbing my arm. "Sit around here, burning a hole in your cards? Don't you want to keep up the research?"

"I figure I can, here."

"UCLA? Berkeley? So Cal?"

"I was thinking more along the lines of my parent's basement."

"Brae," I frowned. "But you're so close. How many hours do you have left, thirty-two? Why not just finish it up?"

She scrunched her face and cocked her head, letting her hair bounce. "And then what? I'll be stuck with a boatload of loans, begging for some niche doctorate program to accept my thesis. Exospatial Bioresonance Imaging. You think they hand out grants for that?"

"I'm sure a program would accept you, maybe Synthbio. Or Computational Modeling, they deal with imaging a lot, actually."

She reached out her hands, palms up. I hovered mine own over hers, glancing skin. She smiled at me, and the spontaneity of the game. With a flinch, she flipped her hand out and up to smack mine, but I pulled away, nearly knocking over my chair.

"Too quick for me, Cal," she said. "But no. What about you, now that you're done at the station?" She paused. "What about us?"

I took a deep breath, turning away. Beyond the windows of the cafe, a hundred colored beach umbrellas bisected the blue of the sky and surf. The hot brown sand blended heat waves with baking bodies under the white glare of Sol. A skateboarder pushed languidly along the sidewalk, carving weighty parabolas in the concrete. Behind it all, the fuzzy rush of the surf, oscillating in peaceful static.

"Us," I muttered.

I put my hands out, palm up. She played along, balancing her palms above mine, like polar opposite magnets.

"Us," she repeated, more energetically, tensing for my strike. I faked her out with a clench of my jaw and she pulled away with a squeal. Then slapped her knuckles when she returned. I kept her hands pressed to the tabletop, idly running my fingertips along her delicate wrists.

"I was thinking of staying here. I like the sun. There's the beach. The mountains are close. I'm sure someone has a post-doc."

"Oh Cal," she said, beaming, bouncing in her seat. "Mr. California."

I nodded, letting her enthusiasm infect me. Then she leaned forward, eyes closed, breasts resting heavily on the tabletop, lips pursed and gleaming. We kissed deep, wrestling tongues, creating a suction bond inside our locked mouths, a vacuum holding us together. Her eyes were wide when she finally pulled back.

"I love you," she whispered quickly.

It was as if she wanted to let it slip into the thin air without consequence, a twitching burst of her brain escaping into the atmosphere. But her lungs and mouth gave it form, and sound, and brought her notion to me.

I was nervous for an instant, wary of the tendrils inherent in those three monosyllabic words. For a long, pregnant pause, the silence fermented. Her self-consciousness began to peek from the shadowed corners of her sunny countenance, the tip corners of her smile to droop.

But I clenched my teeth, grinning. "I think I love you too."

o

I've begun a series of experiments with Alpha. First, I dismantled another set of cabinets with the smooth metal face places, cutting them to fit the front porthole. Placing the smooth metal behind the glass creates a reflective surface, in order to

simulate a crystal node. I cut a circular opening in the mirror to allow a focused light through.

Then I took the brightest lamp we had and placed it in the center of the porthole, lining it up with Alpha. I affixed a small timer to the button in order to quantitatively measure the length of outbound signal. Then I also panned the front cameras to face Alpha and the surrounding dark, feeding the recording through a modeling program.

The first test worked well. I sent a small flash towards Alpha. Within a second comes the response, the light in the dark bouncing back the half second of white light. Immediately following, the camera detects of flash of the spectrum, deepest red to blackest blue. And then Beta and Gamma fire off.

This appears to be the control - the default response of Alpha given a brief flash of light. But there are thresholds to other behavior. Flashing the light for under a tenth of a second does not register with Alpha. Decreasing the voltage on the lamp, in essence weakening the light, has the same effect. There is no response, only endless black water.

A steady beam for over five seconds also appears to short Alpha out. It begins to respond with its own beam, but shivers out in a small fraction of a second. The spectrum flash also fails to occur.

From the range of tests, I've uncovered Alpha's state machine, the set of outcomes given a set of inputs. There is a minimum quanta of light that fires off the crystal. If it accepts the light, there is a delay while it processes the signal, possibly converts the photons into usable energy through Robert's photosynthetic hypothesis, and then returns the light. If the crystal receives light when attempting to return the blast, the cycle is short-circuited, reset, a loop in the state machine.

By analyzing the data sets and the timers in the modeling software, I'm able to determine the delay is almost exactly five seconds. The remaining decimals account for the distance between the pod and Alpha, nearly seventy kilometers.

Extrapolating the data, and the time it takes Beta and Gamma to start, I find those nodes to be many kilometers distant as well. The entire field of lightworks stretches far above and below us, and the fringes even seem to fade off into the deep underocean, too faint to register with my naked eyes.

Utilizing the camera's selective zoom, I'm able to amplify the light for a number of structures. The lightning Minnows that swim in a plane perpendicular to Tree are in fact each hundreds of nodes. Clown Nose is a massive ball of swirling red, perhaps hundreds of kilometers across. What I had thought was the originating light, Alpha, seemingly the largest and brightest of the nodes, is in fact the closest and smallest of them all.

I've also begun to suspect the nodes are moving. It was hard to tell at first, merely a twinge of perception, but the shapes and motions of the patterns were slowly changing. Tree is becoming narrower, the green of the fine foliage less vibrant. The blue of Gamma sprouting hints of purple and silver. The orange tendrils of Beta taking on a touch of flame.

I am still not convinced, as Robert is, that this is a living thing. It is a vibrant spectacle, but it is crystals and prisms. Is the Aurora Borealis a living thing? It is beautiful and transient, but merely an anomaly of magnetic fields and solar radiation.

Still more pressing is the matter of change, the cycle of the networks. What induces the change? Currents in the underocean? A widening crack in the core, shifting the hot vents? Or is it something more, something reactive, even intelligent?

I have seen the lights shift from source unknown. Now is the time to see if I can change them, control them.

π

I remember the day Brae met Robert. She hated him at first, come to think of it.

We were up the coast, way up in Seattle, visiting the Olympics, snapshots of Rainier in the mist. Robert was collaborating with some bigwig venture capitalists in Redmond.

I hadn't seen my old friend since before the semester in orbit, and I called him on the off chance he'd have the time to catch up.

"Cal, my friend!" he boomed in my earpiece. "We'll definitely need to meet. There are some great places along Market. You like seafood? The best, I tell you."

"Ok, if I bring a guest?" I timidly interjected. "We're up here together on a short vacation."

"Sure, sure, a friend of yours is a friend of mine. Might I ask his name?"

"Her name," I mumbled. "Brae."

"Brae!" he exclaimed in a rolling laugh. " A fine Irish lass I knew her name was sweet Brae Lyn." He began to sing a quick Irish jig. I could picture him shuffling his feet under his big frame. "Certainly Cal, it would be an honor to meet your lady friend."

And meet her he did, with a monstrous bear hug that lifted her a foot off the ground, her face in his red mane. When he set her down, he bowed deeply. "An honor, my lady."

After the first round of drinks, Robert excused himself to make a quick call. Brae leaned over and whispered in my ear. "I'm still picking little red hairs out of my mouth." I chuckled, placing a comforting hand on her thigh.

"He's alright, once you get to know him. Give him a chance."

"I did give him a chance, before he lifted me off the ground and buried my face in his beard," she hissed. "And the bow. My

Lady? Who says those things? Does he think he's living in medieval times?"

I grimaced. "Robert's a very respected scientist in his field. He pioneered Exobiology. You know he's the lead candidate for the Europan expedition."

"Just great," she sneered. "He can start a colony of crazy Irishmen."

I saw the big man was coming back in, snapping shut his phone. I quickly gestured to Brae to kill the criticism.

He sat with a thump and a sigh. "If you're waiting on me for your next drink, that there is a tragedy."

I chuckled, raising my half empty pint for a weak toast. Robert clinked my glass, but Brae abstained.

"Lass," he said, curiously deflated. "If I've done something to offend you, state your piece and have it out. I'll be happy to oblige ya."

"Offend me?" Brae was puzzled.

"Neglecting a toast is up there with desecrating graves in old Ireland."

She forced a grin, lifting her glass into a makeshift tripod. "What are we toasting to?" she asked, arm up, head cocked.

"Good times?" I volunteered.

"I'd rather live in interesting times," Robert boomed. "They make for better stories."

Brae conceded, nodding her head.

"To interesting times," we repeated, clanking our beverages, downing them in unison.

When another set had further greased the cogs of conversation, Robert cocked his head and asked, "What is it you do, Brae?" He was positioned at an angle to the table, his ankle resting across the breadth of corduroys, the sleeve of his brown leather jacket buried under the tangled red mess of his beard.

"Well," Brae began, setting down her drink, pursing her lips as a prelude to an honest answer. "I'm taking a break right now. I have a few semesters left to get my masters. Bio Modeling."

"Ack," Robert exclaimed, uncrossing his legs and leaning forward. "We could of used you in Antarctica a few years back. Absolutely amazing creatures under the ice, but the diagrams were simply awful."

"It's an interesting field, lots of opportunities. Although Antarctica is a little remote."

Robert perked up, raising his eyebrows, thick red caterpillars. "Ah, but that's where the exciting work is, lass. The remote and desolate places of the world, the frozen wastelands at the tip of the planet, even the moons of Jupiter and Saturn."

"You think there's life there as well?' I asked, fiddling with my empty pint glass.

"We'll just have to find out, won't we?" Robert said, his big hand slapping my back.

"We?" Brae asked. "Cal, you never said anything about crazy offworld expeditions."

"Brae, don't worry about it," I muttered, leaning into her. "Just some drunken bet Robert had with me."

"You're not actually thinking of going with him," she said, her mouth hanging open.

"Well..." I frowned. The waitress brought another drink and I began to chug it down.

"Well?" Brae echoed, arms open in question. "Just remember, where you go, I go."

"Better bring yet sweaters lass. I hear Callisto gets cold."

"Minus two-twenty degrees," I croaked. "It's a bit warmer in the coffins, err colonies. But no worries, my love. Robert's the hearty one. I'm sure he'll bring back pictures."

"Indeed," the Irishman said, raising his glass again.

We toasted to that.

θ

Robert's Journal
The Great Cosmic Diaspora

I am not entirely convinced by the Darwinian arguments of life emerging from the primordial ooze. Given, experiments have

generated amino acids in the lab utilizing apparatus to mimic the warm shallow seas of early Earth. But the building blocks of proteins are not life.

I lean more towards the theory of the great Diaspora. Life did not spontaneously arise on our hot young planet, but it was transported there via comet.

In those days, Earth would have resembled a cratered rock of volcanic fire and ash, reclusive pools of water under the cooling igneous overhangs. Comet and asteroid strikes would not have been an uncommon occurrence. And while the vast majority of these violent attacks left behind radiation soaked pits, perhaps there were a few that brought more.

Perhaps it was a fully formed cellular nucleus, a molecular machine to consume those sprouting amino acids in the ooze. Or perhaps it was something else, an intermediary that has since perished or disappeared – leaving earth's resultant life to emerge completely different. It's impossible to say precisely what form the pattern seed took.

We can never be certain the Diaspora seeded Earth, for that truth has been erased from knowable history. We can only view the effects and speculate. But what of other planets, other worlds that harbor life? What of Europa?

Like Earth, it's entirely possible the crystals self-aligned in the rich sedimentary muck along an undersea faultline, catalyzed by the seeping heat. But it does not ring true to me.

What could break through the icy crust, injecting enough energy into the closed system to jump start the crystal machine? A comet, carrying the spore - the key of the Diaspora.

If we accept the miraculously slim probability of spontaneous life arising over a large surface - such as the early earth - it's even more unlikely in the frozen cracks of a comet.

The seed of the Diaspora must have another source.

Perhaps it was the vast fields of gas - the birthing place of stars - that provided the seed. Though a self-perpetuating "cell" of molecules is exceedingly complex, the endless seas of gas might coalesce into a proper seed. However, most life contains a heavy, multi-purpose element - carbon or silicon. These atoms were not crafted until the gaseous fields grouped into stars and initiated fusion.

Others have speculated the Diaspora comets are the work of an ancient civilization distributing the seed billions of years ago - a benevolent quest to terraform the galaxies. Some even go further and call the comets the very literal "hand of God", bringing life to new planets.

Perhaps the answers are beyond the sight of modern science. Maybe we will never know the source of that spark, that seed that

differentiated dead molecules from life. But in that great mystery is the promise of a single thing - a seed, tiny, pure and bright - from which the wonders of life were extrapolated.

In the mundane cold of the camp, I can watch my monitors, peer to the stars and hope.

ρ

It's difficult to picture the life of the universe. Our lives occupy an indeterminable fraction of a single day in the universe. It's as if the clock was unplugged, our lives lived, and then returned to tick.

There are fields of gas, when traveling at the speed of light, would require the span of human existence to cross. Seven thousand years. These light-year pools of hydrogen atoms slowly coalesce, like bathwater draining, like a snowball rolling down a hill. And they grow. The tiny spark devours the ocean of molecules, gorging on these simplest of atomic creatures. Yet like the vast cetaceans of the Pacific, even krill will feed the leviathan.

A star is born.

σ

Boredom takes me. The days blur into a mass of routine, satisfying bodily functions, killing time with mindless drudgery.

Brae and I are speaking now, but short utterances. We have still not fully recovered, and I'm too lethargic to make the effort.

We burn off our energy by making love like possessed beasts. Rutting about the pod interior, we knock into cabinets, avoiding the sharp metal corners on the bulkheads. The blankets are whipped into a shivering pile, cowls giving abstract form to two joined, writhing bodies.

Between these sessions of mutual lust, I keep my head in Robert's journals. I've begun writing myself. There is a story here, though it is difficult to find. There have been events filled with tension, the thrill of struggling for life. But what of theme? What of metaphor, character arcs? I feel the same as I was, though tired. And the meaningless of the disaster makes it difficult to find a central theme. Our lives have been one damn event after the other.

Yet I am confused by the memories that spring to life when I am quiet, contemplative. They rush over me like dreams, vivid as yesterday, fragments of the life I've had. Perhaps they are pointing to some cohesive whole. Brae plays a part. And Robert. What do the people we know say about us?

My greatest fear is that the tale will be lost. If our death is inevitable, so be it, but let our tale be heard. Let the sweat-pouring necessity of it survive. Let the blood boiling lust of it persist. Let

the slow, frozen tragedy of it rise to the top, like a thin vapor into the atmosphere.

τ

She is starting to show.

When she emerges from the steam bath, her skin mottled pink from waves of water, I can see the soft rise of her belly. The skin is firm, pressed outward by the growing life inside. I touch her arm as she moves past, but she jerks away. Before I can plead with her, she pulls a robe over her shoulders and steps behind her private curtained wall.

Dejected, I return to the front porthole to continue my experiments. Alpha no longer appears to be the keystone of the lightshow. It's merely a switch to set off the fireworks, not the actual circuit connecting the nodes into the rest of the network. The bridge itself is further down and out, invisible to the naked eye. But I've been able to spot it in a small window of time before the natural light cycle starts up, every evening.

I first saw it a number of nights back, when I kept the vid feed on Alpha. I wanted to find Alpha's power source - the node that was feeding it and setting off the Beta, Gamma chain reaction. Reviewing the magnification, the computer was able to detect a distant light a few degrees south of Alpha. It was only when the

latter node began to pulse, nearly a minute later, that the precise location could be discerned.

My goal now was to send a signal to this new node, which I labeled Null. In the Greek alphabet, Alpha was the first character, representing the first variable. Yet in the underocean network of nodes, Alpha was not the first node in any sense of the word. There were probably many thousands of nodes older and higher in energy hierarchy. Yet, from my perspective, Alpha was first.

It's a telling story in the history of science. Even in objective observation, orientation matters. The Greeks believed the sun and planets revolved around the earth, since all appeared to arc across the sky. Even after the great astronomers of the Enlightenment debunked the theory, analogue effects persisted in many other fields, from physics, biology, chemistry, even economics. The atom was a near mirror image of the heliocentric model, electrons orbiting an energy-heavy nucleus, until Plank introduced quantum theory. Darwin experienced great resistance to his theory of evolution in the general populace, primarily from anthro-centric sentiments. Even in biochemistry, the very notion of extraterrestrial lifeforms was dismissed on a number of planets due to low carbon concentrations. It wasn't until the discovery of silicate-based lifeforms that the theory was given weight. Even numerous ubiquitous social constructions - capitalism,

representative democracy - were accepted as best by majority, even after disproved by Gamit's discrete unit algorithms.

There were those who questioned the persistent human notions through the ages, the skeptics, the progressives. They could interject a much-needed viewpoint into the debate, breath fresh air on a problem. But too often, they would drown in doubt, until even the axioms of the universe were put into question, and they were driven mad by nihilistic relativism.

And while Alpha may not truly be alpha, it is a proper name for me. Because names are tools. In my internal model of the undersea network, Alpha was first. It was the starting point for the pattern chain, upper left hand of the diagram, page one. Yet now there was a predecessor, a catalyst for Alpha. Thus Null, a thing before it all, primordial and unknown. My cameras could not see beyond Null - it was the very threshold of my sphere of understanding.

Null would stand as my first cause, and even if the universe knew of what lay beyond, I would not. My truth would not be that of the universe, but it would be good enough to live, survive, even thrive.

υ

"I've been having strange dreams," she says. She is standing with her hand on her hip, the bulge of her white belly pulling tightly her thin shirt.

"Yes?" I say. "Like what?"

She raises an eyebrow. "So you're interested? You didn't seem to care when I had something to say earlier."

"I care."

She moves closer with timid steps. When she spots the mess of contraptions in the navroom, she fixes me with a confused gaze. "What is all this? You stripped the cabinets for scrap metal? Is that the light taped up to the porthole? Why?"

"Some experiments," I say. "The light and whatnot."

"Those fireworks are still going on?" she asks. "Same as always?"

"Not exactly. But tell me about your dreams."

"The dreams," she says, sighing. She looks around for a chair to sit, finding they were filled with an assortment of tools, scrap metal and bits of plastic. Finally, she settles herself to the floor, leaning against the bulkhead. "Dreams are dreams, you know. For the most part, nonsense. Lots of disconnected images welded together, sometimes a disjointed story. They usually make no sense."

I nod, grabbing the pile of blankets I used as a makeshift bed. I hunch down next to her, spreading the fuzzy fabric over both our legs.

"But these dreams I've been having are terribly real. Everything is so vivid. It doesn't just appear in front of me, like a movie projector. It's as if I'm actually there, conscious, and can move around. I can actually control where I go in the dream, what I'll say, what I'll touch and look at. It's simply amazing."

"A lucid dream," I say. "It's where the brain gets tricked between states of consciousness. The visual cortex is still stuck in dream mode, but the hypothalamus, the regulator of consciousness, has woken up. It's rare, but certainly possible."

"But I'm having it for every dream. It seems like it lasts for hours."

"It could be the pregnancy. The low gravity could be affecting your hormones and sleep cycles."

"Cal," she says, leaning closer. "I dreamed I was on this pod. Stuck down here with you, exactly as we are now. But I could move outside of the pod, out into the underocean. I could swim around in any direction I wanted, without needing air, as though I was a ghost."

"What did you see?"

"I saw you," she says. "You were hunched over your machines. Doing whatever it is you're doing." I grimace. "And

the lights. They were outside, sparkling in patterns and colors. I could look at them from all angles. It was if my brain had a complete map of the nodes and could automatically create the scenes from different angles seamlessly."

"I've been taking meticulous maps of the nodes and the light patterns. Maybe you can look them over, compare them to your dream."

She shakes her head. "I don't remember it now. It was coming too fast, I was too excited to stop and pay attention. I was just overwhelmed with the ability to move and observe consciously, instead of having the visions cascade over me."

"What did you learn about the nodes? Did you learn anything about the light? Something new?"

She bites her bottom lip, thinking back. "Before I woke up, there was something." She pauses, as though working the abstract thoughts into words. "I moved back, almost as if I was zooming out on the nodes. I was growing, larger than the pod, as big the moon itself, yet I could still see into the underocean. Like we were in an aquarium with a big glass wall holding in the water but revealing everything.

"I could see the entire complex of nodes. When I zoomed out, our pod and these lights around us shrunk away. Out here," she says, pointing to the porthole. "These lights are just the very tip of

the network. It was like the map of the human blood vessels, and we were just a capillary.

"It was continually firing, blips of color and light circulating the network, from the poles of Ganymede, across the equator, back to us in our tiny frozen corner. And when I saw it holistically for the first time, I realized it was reacting to us, trying to figure us out. Cal, it's trying to communicate with us."

I frown. "As much as I hope you're right, we need proof for that. It's reacting to light I send out, that much is true. But right now it's completely mechanical, there's no intelligence behind it, no intent. We have to be logical."

She pushes the blanket off her legs violently. "There you go again, with your logic. Logic would have you disown your own unborn child." She stands up, leaning against the bulkhead to steady herself. "You're too logical to love."

"Brae, wait," I plead, rising with her. "I'm sorry." But she turns her back, pushing into her den of pillows and darkness.

ϖ

"You're too logical to love." Her words echo with me, accusing and sharp. Biting.

I once attempted to create a philosophical definition of love, using only biological axioms. It was relatively successful,

certifiably true. Love could be marked up as a collective mental abstraction of all hormonal, physical and emotional ties that bind mating partners. The definition was lax enough to extend to family members, friends, even impersonal objects, like clothes and houses and music.

But it rang hollow.

As I grew older, I became disenchanted with the term. It was overused - the tertiary utilizations to describe various widgets - "I love this pen" - and items of consumption - "I love this wine" - weakened its true meaning. I began to say thing to Brae like, "I'm incredibly fond of you," and "You're very important to me." But these attempts at clarity only clouded the issue. Without those sacred three words, it was if the feelings I felt were second rate. Without those three words uttered daily, I had fallen out of favor, "something was wrong."

And it struck me that the essence of love isn't summed up in a single slice of time, with a definite choice of words, but rather the repetition of those mundane monosyllables. By telling her I loved her every day, we would build a pattern of trust and shared experience. Just as the words were a literal anchor on an abstraction, their verbal repetition became an anchor for our relationship.

It was amazing how this new system played out. If the words "I love you," spoken audibly and honestly represented a point on a

graph, I could map out a line. For the most part there would be daily points, creating a slope of the line - the continuum of our relationship. I would say the words in the morning, before we parted for our respective jobs, then in the evening, before bed. Those were the anchors to create a solid slope, usually a horizontal line.

If I neglected the words, the line would slope downward, a negative in our relationship. Honesty and tone were important, which is why a sarcastic utterance wouldn't count on the chart, or perhaps dwell on the negative Y axis, drastically tugging the line south. Yet when I interjected the words outside of the daily routine, perhaps on a surprise call, or a detailed letter, the continuum would positively benefit.

The slices of our lives are but discrete points. When judged isolated and naked, they may appear brilliant, filled with color and movement and life. Or they may be dull, listless, drifting in the underocean void. But plot the points. Find the slope, the story of those moments. It is then the constellation will be drawn, and even the brightest point of light pales in comparison to the illumination of the whole.

Part III: Life

α

Photons streak out, dispersing off the sluggish conjoined H2O molecules, spilling into a splatter of frost and light. They bounce off the outer electron wall, ionizing the slush, shooting off a billion negatively charged particles into the inter-atomic ether. Yet the holistic beam continues on, direct as it was aimed, to feed through the notched chambers of silicate crystal.

Trapped within the reflective cage of frost and sharp-edged silicon, tiny structures nibble at the light, sapping bouncing photons. Consumption yields energy accumulation, miniscule silica manipulating the particles of charged dust. Inward it flows, to a crystalline heart of white and blue, a trillion notched docking bays for the carriers. In a pulse of prismed light, the energy potential flows, the dust discarded. The node fires, the inner crystal naturally dispersing the light into chromatic spectrum, but only for a single uncountable moment.

Null absorbs and fires, outward to a dozen other receivers, many uncountable and invisible. Alpha follows, a distant white sun.

I smile and fold my arms as Beta fires up, the first blue streaks connecting into spiderwebs of azure and periwinkle and purple. The flames of Gamma flare, a few inner node clusters white-hot

and blinding. The green towering mountain of Tree begins soon after, painting the monitors a ghostly collage of foliage and water.

There is a rumble. It's not a sound so much as a vibration, a deep slow tone riding through the underocean currents as a shockwave. The entire pod begins to shake, and the water outside is filled with bubbles.

Brae emerges from her den, her face is distraught. "What's happening?" she moans, eyes fixed in fear.

I lean against the bulkhead, reaching out a hand to grab her. "I don't know." I have to speak loudly to talk above the din of rattling metal and the rumbling pod.

Brae staggers suddenly as the floor moves beneath her feet. I strain to hold her, pull her up. The entire pod is shifting violently, jerking in its icy moorings. "I just set off the fireworks," I say, gritting my teeth.

Another bump sends us both to the ground, sprawling. Brae yelps when she hits the metal, her arms twisted beneath her, legs splayed. I'm on my knees, hugging her, pulling her up. "The suits," I yell, crawling towards the back den. The floor begins to tilt, a creaking groan yawning through the length of the pod.

I tear at the curtained wall with clawed fingers, throwing aside the blankets to find the vacuum suits buried beneath. They haven't been maintained since the last use, nearly four months ago. The

seams are probably worn out and leak air. We'll be lucky if they keep us alive.

Stumbling back to the navroom, I trip over a bulkhead and bang my shin as a particularly large shock rips through the hull. The entire frame creaks and moans.

Brae is holding her stomach. "I feel queasy," she says, her face in a knot. I toss her the suit.

"Get it on. We need to move fast. I'll get you some nausea pills."

Once I pull on the thick legs of the suit, I shuffle back towards the supply closet. The various drugs are a mess, scattered about from the turbulence and Brae's past use. When I find the nausea pills, they are nearly empty. "Morning sickness," I mutter, snatching the bottle.

Brae downs two while I finish pulling on my suit top, flailing with the zipper on the back. Brae has to help me, but is thrown once more to the floor by a series of jerking thumps.

There's a crash from the navroom as the experimental equipment breaks off the front port. The sheets of metal bang and rattle together as they fall, revealing the roiling underocean in its full glory. The bubbles are still ascending rapidly, as though we are stuck in a pot of boiling water, but the nodes continue unabated, under, above and all around us.

The pod tips like the deck of a doomed ship, and I pull Brae to me. She hugs my shoulders as we tilt, the entire pod flipping lengthwise. I wedge myself between a cabinet and a bulkhead, arms around Brae, her fearful whispers in my ears. Her hair veils me from the scenes of destruction. "I don't want to die," she says, raspy and grating in my ear. "I want to have a baby before I die."

Then the pod is vertical. All that isn't locked down tumbles forward, rushing dangerously past us. I can hear the spare scrap metal, tools, helmets, food rations and pill bottles clang against the navchairs, only to settle against the porthole, sucked downward towards the underocean. Then the loose shirts and billowing blankets, drifting like heavy sheets of snow to drape over us.

We're upended for a good minute, the rumbling subsiding, fading into the upper reaches of the underocean. We scrape free of the anchoring ice and begin to slide, sinking downward into the dark abyss.

It becomes quiet. I can hear Brae's fevered breathing, still hard in my ear, but the sounds of rending metal have ceased.

"Why are we sinking?" she asks, peering out the porthole at the ascending bubbles. "Shouldn't we be rising? The pod is hollow, why don't we float to the surface?"

"The fuel tanks are mostly full," I say. "We never dumped the H20 and oxygen reserves before the crash, so our small air pocket

doesn't make up for that density. Even so, that doesn't account for the rate we're going down. It's as if something's pulling us."

She squeezes a final time before letting go and leaning back. We're perched on a tiny corner of cabinet, a good four meters above the porthole, which now serves as floor. "Can you get down?"

"I don't want to jump," she says. "Could I break the window?"

"Doubtful, since everything else already slammed into it. But you don't want to twist an ankle. Here. I'll hold your wrists and lower you down."

She swings her legs over the edge, the big vacuum suit boots comically large as they dangle over the gap. Pivoting around to face me, she holds out her hands. "Don't let go," she whispers, scooting out and off.

I strain to lower her slowly, jamming my foot against the bulkhead and gradually unflexing my arms. As she extends her arms fully, she's still a good half-meter above the console panel

Looking downward, the front porthole is awash in bubbles, huge gouts of air that burst against the window, coating it with streaks of frost and smaller jets of foam. Beyond the bubbling sheet I can catch glimpses of the network, alien formations of color and light.

"Ready?" I ask.

"Yea," she says, quietly, watching the bubbles and light as well.

"On three," I say.

"After two?"

"What?"

"One, two, drop?" she asks. "Or one, two, three, drop?"

"The first one."

"One, two, drop?"

"Yes, go," she rasps. My arms are getting tired, and my stunted fingers have difficulty holding onto her.

"Now?"

"No, after three."

"After three or on three?"

"Just drop me!" she yells.

I comply, releasing my gloved hands from her wrists. She lands in a crouch, crunching off the corner of the console and onto the wide expanse of the porthole. I slowly lower myself down after her, hanging off the edge of the cabinet before dropping.

"What's that?" she says, pointing downward. I squint, trying to follow her signal. It's difficult to see beyond the bursting wash of bubbles and foam. "There," she says, pointing closer.

I kneel on the glass, my face against it. "See the red?" she says. I catch a few lines of glowing crimson beyond the bubbles.

"It's probably just another network pattern. Like Gamma or Clown's Nose."

"Gamma? Clown's Nose?" She is bewildered.

I shake my head. "Just names I made up for some of the light patterns."

"I don't know," she says, biting her lower lip.

The bubbles suddenly cease, as though wiped away from the porthole screen. The window is lucid, swallowed with the black of the deep underocean. Yet below, off center and growing, is a mass of smoldering red. It moves in roiling lines, molding and shifting. I can see jets of gas escaping from its crimson maw, drifting upward at an angle with the currents.

"You were right," I sigh. "That's no lightshow."

"Cal," Brae whispers, her face pressed to the glass by mine. "We're headed for it. It's lava, right? An opening in the moon's crust."

I nod, solemn. Our trajectory seems to be taking us directly into the gaping pit of fire.

With baited breath we watch as the mouth looms larger, until it fills the expanse of the window. It is still below us, half a kilometer or more, a vast field of cracks and fissures in the core, breaching the underocean with red fire.

There's no stopping us now. The heat of the core's magma will melt through porthole, immediately flooding the pod with

pressurized water. The heat of the vents will instantly burst the water into steam, exploding the hollow pod. I know this. Brae knows this. She breathes and looks to me, away from the sight of our rising doom. Behind her puffy eyes, reddened with the vestiges of fear, there is a hint of stoic calm.

I nod, pulling her in, nestling into her sweet curls. "I'm sorry Brae."

"Don't be," she says.

"But I am sorry. I'm sorry I dragged you into this mess, offworld, to this godforsaken moon. I'm sorry we couldn't have just settled down in a nice house. We'd have that baby together." I drift off, my eyes welling, sucking sweet lengths of her clumped black strands.

"Cal," she whispers, rubbing her cheek against mine. "Don't be sorry. I love you, more than anything. Even here, in this place, I love you."

As the black is consumed by ever pressing red, and the steam begins to fog the porthole, I close my eyes. Her lips are on mine, her tongue over mine, and though I have shut off sight, I can see her by touch. I can see her as the day I met her, gleaming with a carefree joy, bouncing friendly. I can see her as the day I loved her, passionate kisses in the half-light, the slope of shadows on freckled skin, the way the sheets folded over her curved form. I

can see her as they day we wed, radiant in white, as pure as our new beginning, our new life as one.

Her lips are sweet, but there is a hint of salty tears, and I am reminded of our frailty, two lovers searching and yearning. We breathe together, sharing air, a final communal, physical act.

And then the black behind my eyes is flushed with white, brilliant and vast. I am blinded. The world sheens and is painted new, as though I am emerging from the womb for the first time, reborn.

β

We are alive.

We hang over the fiery expanse, waves of steam washing over and around us.

Eyes slowly open, the flash of the white blind fading, the scene spills over me in foamy swells. The pulsing, beating red below us, belching plumes of steam, gray distorted sheets in the distance. And the pod, completely wrecked, the meticulous machines and devices we had arranged for survival over the last months trashed in a few moments of violent chaos.

Brae, still crouching on knees and elbows, hair in a black rippling cascade, a shroud for her tears. She looks up, eyes

streaked red, as though she had peered into the heart of the abyss and it broke her mind.

"Cal," she whispers. "No. No, we can't do this. We can't stay like this."

We're suspended somehow above the fire. From the porthole, it's not possible to glimpse our savior. I stand and pull up to the first bulkhead to catch the starboard window. The jagged edges of white crystal cover half the glass.

"The crystals," I say. "Looks like we wedged into one of them."

"What?" Brae gasps. "So the dream. They saved us."

I frown. "I wouldn't say save. More like - provided a much needed obstacle for our descent."

"What was the rumble, Cal? Why did we break free of the ice and tumble down here? You said you were doing something with the nodes?"

I slowly nod. "I was experimenting with the 'root' node of the sequence. The node that sets everything else off."

"What, did you shine a light at it?"

"Yes," I mutter. "Light activates them. The right intensity and timing."

"And now we're down here, on top of some more. What if these trigger off the explosion again? What if there's another eruption?"

"It wouldn't be good," I sigh. "The hull is made to withstand a considerable amount of heat. Well, maybe not the patch. And the portholes can be a bit weaker."

"Could we put up the heatshield we use for atmospheric burn?"

"We could," I say. "If you want to lock us in here without any view to the outside. They take too long to deploy, up to a full minute. I don't think we have time. You remember last time, there was very little warning."

Brae struggles wearily to her feet, leaning against the seatback of a navchair. "Cal, what about food? The chambers might work upside down, but certainly not horizontally. The media is probably smeared all across the tubes right now. What about the life support? And the supply cabinet, we'll have to strap on harnesses for a climbing expedition just to get up there."

"I know," I say. "I know Brae. I'm thinking."

"What about the booster?" she says, glancing over to the consoles. She hits a key, pulling up the engine schematics. "If we're vertical right now, a single burst of a side booster should push us down. In this dense water, we should set down gently on a side, preferably the underside."

"The boosters are just so risky," I say. "The propulsion will instantly steam the water to a pressurized gas, which will expand rapidly. The pressure this far down won't let the gas escape

through the nozzle, it'll just explode in the chamber. We could end up with a gaping hole in the side of the pod."

"I know," she says. "But what about lowering the heat output? Can we pump unheated air out? It should be enough to tip us."

"It's a possibility. We'd have to rewire the booster itself, probably disconnect some pipelines in the shaft. There's the risk of a fluid leak, a radiation leak, even opening a hole to the outside..."

"Cal," she says, firmly. "We need this. I need this. I'm going to have a baby."

For a moment, I stare out the starboard window at the expanse of water beyond us, clear and open. It looks peaceful, almost inviting, as if I could pop open the hatch and go for a swim. But I know it's extremely pressurized and cold, instant death to any foolish swimmer. Even now, inside our metal container, it threatens.

"Ok," I say. "I'll do it. But I want to make sure we tip the right direction, onto more crystals. The last thing we want to do is knock ourselves off this perch and plummet into the fire."

She nods. "I can pull up the cams, I think." Flicking a set of buttons, the HUD comes on, bathing our feet in a dancing array of overexposed green lines.

"Move it to the side console," I say.

We both crane our necks to see, but the four wide-angle cameras work well enough. Starboard is encrusted with crystal growth, a tall spire of jagged nodes meshing with the pod skin. Even the cam is obstructed by a handful of crystal spines. The topside and port are free, open into black empty underocean. On the underside of the pod, the hull cam reveals a glistening bed of crystals, a narrow bridge connecting the starboard spire with another growth.

Beyond, the cam displays a number of spires rising high out of the ocean bed, arcing over to absorb energy from the cracks in the crust. The front porthole is wedged into a small opening in the bridge floor, giving a wide view of the lava pits. If we could knock ourselves loose of the tall spire, we would tip back on the underbelly of the pod, nestled snugly between the two spires.

"It'll work," I say. "But the last thing I want to do is melt the crystal to starboard. It's supporting us now, and holds up the bridge that will support our weight after we tip. We don't know how the crystals will react to that kind of power surge.

"Ok," she says.

"I'm gonna climb up." I murmur, planting a boot on the bulkhead. "Check on the booster piping."

Climbing in the full vacuum suit is no easy task, and is only amplified by my half hands. The vacsuit gloves have stiff enough fingers, however, and I can wedge them into the metal creases of

the bulkheads and cabinets. I'm able to reach the first bulkhead, into the living quarters, without too much difficulty.

Then I am blinded. White floods the room, as though I am staring directly into the sun on a cloudless earth day. My pupils shrink rapidly, burning from the excessive stimulus. Even with my lids clamped down, I can see brilliant pink, the light penetrating the thin layer of skin and capillaries.

"What is that?" I hear Brae yell. It's stronger for her down at the porthole, exposed to the underocean. The light would flood up from the beneath like a roiling tide.

"The crystals, Brae. They're firing. Close your eyes. It should pass."

In another few seconds it is done, draining from the pod as fast as it came. I am bathed in dark, my eyes too fried to see in the dim ambient cabin lights. I rub them with the side of my glove.

"How often is it, Cal? Every few hours? We won't be able to sleep in that."

"I know, babe, we'll have to do something about it."

Climbing into the central living compartments, I can see Brae's warnings are confirmed. The biosynth tubes are splattered with the yellow gel of the culture. One is even cracked open, solitary drips spiraling off into the open chasm below. I grit my teeth and pull myself higher.

Now was the most difficult part, maneuvering up into the narrow corridor of the supply room and engine chambers. The living chamber narrows with a set of cabinet doors and shelving, but because the pod is vertical, the only way forward is a hole, jutting out over empty space. I glance down, catching a faint glint of metal, wisps of Brae's hair, and the glowing smolder beyond it all. If only I had a stretch of rope.

I pull myself as close to the top of the camber as I can, jamming the clumsy boots into the side of a heavy air circulator, my stunted fingers wedged into a small personal shelf that at one time had held souvenirs and printed photographs. I strain outward, desperately reaching for the thin metal strip that comprises the frame of the stock room corridor.

I can't reach. The very tip of the glove glances along the bolted strip, but there is no bone inside to strengthen the grip. The empty fingertip bends backwards uselessly.

"A bit of a holdup," I shout down to Brae.

She stares up to me, crouched on the wide porthole floor, framed in red and steam. "Yes?"

"I can't climb into the back corridor with this suit on. It's too far out of reach."

"Well, take the suit off."

"You want me to fire the booster without it?"

"I'll wear mine," she calls back. I peer down to catch the tail end of her grin. "Won't do much good anyway if you tear a hole in the hull."

"Yea," I mutter, pulling off the gloves. The zippers are difficult to manipulate with my mutilated hands.

I try again once I have the top off, granting me a little more maneuverability but not reach. My bandaged index finger glances off the bolts. I swear in frustrations.

Leaning out, I can see a handhold a few centimeters beyond the entryway, the thick handle of a supply chest. If I had another foot of reach, I could grab it and hoist myself up.

Putting the crumpled vacsuit under my anchoring foot, I pivot my other foot against the sheer wall and reach out with my right arm. Almost.

Under my foot, something shifts. The crumpled vacsuit deflates, slipping off the shelving, pulled down by gravity. Off balance, my leading foot begins to squeak down the slick wall, the tread of the boot squealing. My hands are thrashing in raw air.

With a sickening fifteen-meter fall below me, I push off and leap, blindly rocketing my leading hand into the black opening above.

On earth I would have died, or limped away with a broken leg. But the weaker gravity of Ganymede allows me to vault into the free space, hang for a fractional second longer, and wrap my

damaged fingers around the metal handhold, even as the very veins of my appendages are rent with bolts of adrenaline.

I hang by a hand, feet still swinging as heavy booted pendulums.

"Okay up there?" Brae calls.

"Just doing a little gymnastics," I shout back, heaving myself into the yawning passage. It is narrow enough I'm able to press my feet into one side, my back against the opposite. Then I slowly shimmy up, a footstep at a time.

The booster is a vent for the fusion engine. The process of fusion combines free-floating protons and electrons with existing hydrogen atoms to form helium, superheated in a state of plasma. The remaining waste is exhaust, pumped through the insulated piping into a pressurized holding chamber. Firing the booster opens the valve, releasing the super pressurized gas. This is tremendously effective in the void of space. Every action demands an equal and opposite reaction. The force of the vented gas into space is equally applied in the opposite direction, pushing the side of the pod. Under the water, however, there are a thousand other variables.

Dense water fills the booster valve. If that pressure is stronger than that exerted by the fusion exhaust, there is a small chance backwash will enter the pressure chamber, reacting violently with the plasma, even shorting out the fusion reaction.

Far more probable was the water simply exploding into steam, rupturing the booster. By closing off the vent, I can let the gas cool, in hopes it won't instantly boil the water. Once the valve is shut off, I wait.

After ten minutes, I am getting a cramp, anxious anyway.

"Brae," I call down. "Let's fire it. See what happens."

"You sure?"

I pause. "Yes."

Looking down through the cracks in the shaft and narrow corridor, I can just make out her moving towards the console, tilting her head to read the LED display, tapping a set of keys. "I love you," I call down.

She stops and looks up, her hair bobbing. "I love you too, Cal." She hits the key and the booster fires.

χ

She tells me afterwards she saw me falling, plummeting through the air like a smoking rag doll. My vacsuit was open at the top, just a thin nylon shirt flailing in the breeze of the decent, the blocky pants and boots banging off every blunted obstacle on the way down.

But the plan works. The booster fires, blasting into the dense deep water of the underocean, tipping the pod. There is a back blast, overheated circuits igniting in the sudden steam, firing me

out. Even as I fall headlong, the shaft is slanting, gradually leveling out in the water. I come to a rough skidding stop in the living quarters, belly down, face cradled in a knot of bruised forearms.

I manage to prop my head up a few inches on sore vertebrae, raising a single eyebrow feebly. Brae rushes to me then, still holding the steaming fire extinguisher. I see the concern on her face as she shuffles forward.

"Cal!" she calls, skidding to a stop in front of me, down on her knees. "You fell, but we leveled out. Are you hurt?"

I slowly push up, rolling onto my side. My entire body aches, my arms and hips fractionally more than the rest.

"You're lucky you didn't hit your head."

"I hit everything else on the way down," I groan. "So you say the booster worked?"

"I think so," she says. "We're level aren't we? And look, the pod is right-side up. We can use the instruments without breaking our necks."

"Wonderful. Now I have to flip everything upside down again. The food chambers. The navchairs."

"It's ok, Cal," she says, running a hand through my damp hair. "What else do we have to do?"

We are suddenly awash in light, a white so full and intense it transforms my vision into a landscape of silhouettes, the metal on

the walls gleaming endless reflective fire. Brae's countenance is monochrome, fading into the translucence of the overwhelming illumination.

"For one," I say, clamping shut my eyes. "Get a decent set of shades."

She chuckles, then hugs me until the light fades and we were left once again to our quiet, dark solitude.

δ

Roberts Journal
Inner doubts, darkness

I sometimes think of myself a hermit, a lonely old man lost inside a cavernous mind. I am not old, not yet four short decades, but I feel ancient. I have known tragedy, the love of a woman, the companionship of brothers, and joy of celebration and birth. And besides, everyone treats me like an old kook. Must be the hair.

But there is something to be said of solitude. Every man lives inside his head. And what better opportunity to truly reveal the inner self than in quiet contemplation? The depth of man's existence is contained in the tiny spark hidden between the eyes. In meditative concentration, the spark can be fanned and fueled. It can grow into a momentous blaze, a conflagration of ideas and visions and noise and movement and life.

But there is darkness there. For every glorious apex, there is a pit of despair. The gloom of the mind can become oppressively dense, and without the mundane oddities of companionship, it can become overwhelming.

There is death. And there is meaninglessness. A poisonous thought is this: that every insight and every feeling was merely a chemical reaction, confined to the folds of warm flesh inside the skull, bubbling nihilistically until released by decay. It is venom. It can neutralize the most potent of confidences. I sometimes reassure myself that it is merely nonsense, but there are echoes of its screaming finality even in the brightest of rooms, the fullness of day. I can never escape the chance that it is perhaps true. Science will not allow me.

Yet, even in my struggles with that empty demon, there is a hope. Even in the frailty of the flesh, the finite span of cells and tissue and organs, there are ideas. Perhaps in my brain they are no more than flashes of electrons, a mere differential of charges across a neural chasm. But in my mind they are gold, they are light, they are life.

With a cylinder of graphite and a sheet of pressed cellulose, I can encode those thoughts for a hundred years. With a charge of binary digits on a silicon chip, thousands. And so I become eternal. The sting of death becomes mere metaphor for change.

Perhaps I will lose the joys of the flesh, the surges of neurotransmitters in biofeedback rhythms, rewarding or tricking the fleshy machines with imbibitions, reproduction, digestion, pattern recognition. And I will lose the pains and torments of the body, trapped in temporal space, with all its sharp corners. But the light will live, the abstraction of the ideas, bouncing from one reader to the next. Like the directed light of the Europan crystal nodes, filtering through tiny molecular machines to illuminate a glorious whole, so too is my testament.

And then, even in my solitude, I become one of the whole, a key point in the constellation that encompasses us all.

ε

The first order of business is getting an inventory of the ship's working systems. I want to make sure the hull is secure and the volcanic activity hasn't ripped any more holes in the protective skin. The old patch is probably the weakest point, so I check it first. Since the pod has flipped, the patch is now above the navroom, deep in the maintenance shaft. Wary of climbing, Brae boosts me up on her shoulders.

Peering around with the narrow beam of a flashlight, the patch looks to be secure. The welding job is unmarred, and the holding bar is solid. There's a bit of water around the edges, however, more than can be accounted for by condensation.

"Brae," I call down. "Let's pull up the outer cam, top bow. I want to check this seal."

She shrugs her shoulders out from under my boots, and I lower myself down from the shaft.

When she opens up the cam view, half of it is obstructed by translucent white structures - the crystals.

"Can you pan?" I ask, frowning.

"No," she says. "It won't move up, something's blocking the eye."

"Probably the crystals. Do we have another angle?"

"There's the top camera. Although that patch won't be in the line of sight, it's beyond the pod's front curve."

"Pull it up anyway."

But the screen is obstructed by crystals. She is able to pan it downwards a few degrees, exposing the shining smooth top of the pod. Coating the metal skin are the clear shards, thin in places, thick patches in others.

"It's growing over us," Brae says. Her voice wavers between wonder and fear. "Is it protecting us? Or eating us?"

"No way to tell," I say. "But from Robert's research, I don't think they can metabolize organic matter. It's probably something like the coral in earth's warmer oceans – it grows over sunken ships and uses their structure for support."

"We'll be trapped, Cal. It's going to anchor us down here."

"It will protect us for the time being. I think that patch started to leak, but the crystals covered it over. We should be thankful for that, at least. We don't have any other choice."

"What if we shock it off, fired up the shields?"

"And risk damaging it?" I ask. "No. It's too risky. For all we know, we'd be flooded with freezing water right now if it wasn't for the crystal growth. To say nothing of the spires that are holding us above that hot pit down there. "

She sighs, deflated. "Ok. It's your call. I'll go get something to block up the windows."

The other systems are for the most part functional. Aside from the food production, the consoles and computers didn't care if they were upside down or right side up or twisted sideways. The growth chambers required gravity, so orientation is important. I'd gotten the hang of flipping them around only a few months earlier, so it was easy grunt work. While I re-fit the tubes, Brae fires up the pan and makes some omelets. A new batch of hot tea completes the meal.

We have our first test of the blinds soon after. The crystals fire on queue, bursting into a cloud of surrounding white. The front porthole is boarded up with the flat cabinet sheets I had fashioned for my earlier experiments with Alpha, so it remains thankfully dark. The port and starboard windows are closed away with a

similar sheet of metal, allowing only a haloed slice of silver to eclipse the straight metal edge.

The stern viewport is another story. It is recessed high above the storage chamber, difficult to reach without aid of a ladder or step stool, both of which we lack. Even when I perch atop Brae's shoulders, I'm unable to affix the sheet we cut to cover it. Facing upward, there is no natural anchor for the square sheet, and I end up using a full roll of epoxy tape to create the makeshift blinds.

When it is done, black gaps poke from behind the mishmash of tape of metal, forming an odd spiderweb of jagged silhouetted lines. We keep the supply room closed off with Brae's blanket, to ward out the eerie flashing shadows in the deep of the night.

"Well, it's not pretty, but its home," I mutter when the work is done. Brae is scrubbing clean the blackened metal sheet she used as a skillet, soaked with suds up to her wrists.

"I'd do anything for a potted plant. Just something to stick in the corner and watch grow."

"I wonder how it would react to the crystal light? We'd have to keep some ambient light on it, of course, but these white flashes are pretty intense."

"Who knows," Brae says, wiping her fingers through an old shirt she's converted to dishrag. "At least there'd be some use for the light, rather than driving us mad."

"It can be annoying," I say. "But I think it does serve a purpose. Your dream, remember. Like you said, it's communicating."

"God knows what," she murmurs, moving into the living chambers to sit on the side benches. We haven't been able to make use of them for a solid four months, and rarely did in orbit. "It could take years to even begin to understand the syntax and patterns. Maybe if we had a lexicon analyzer, some sort of stochastic engine..."

"We have years," I say, trailing off.

"Don't say that." Her voice is cold. I reach out and put a warm hand on her shoulder, a vain attempt at stability.

"Well, let's hypothesize," I begin. "Let's begin with some assumptions. The light is a form of communication between the crystalline nodes. Whether they are distinct organisms or simply parts of one large lifeform, it doesn't make much of a difference. They're talking."

"Ok," she says, playing along. "So what are they talking about?"

"What are the concerns of any living thing? Energy. Reproduction. Safety. Observation. Those types of things."

"Yes, but didn't you say the light *was* the source of energy? Is it just distributing food along a set path?"

"Well, if that's the case, what's the explanation for the intricate patterns and light shows? Just an unintended side effect of the crystalline makeup? I'm not so sure. Maybe there's information in those signals, some form of intelligence."

"Well, good luck analyzing the photon makeup. I know for a fact our cameras aren't capable of that kind of precision work."

"There's tertiary evidence," I say. "I was able to signal the Alpha node with our little flashlight. You know as well as I that thing isn't capable of providing ample energy for one of these nodes. Yet it returned the signal back to me, a light in essence stronger than the source. So, it's not just bouncing energy along the chain. That may be part of it, but it's not the entire picture."

"What has Robert said? About these nodes. Are the crystals capable of storing information? What kind of internal structures do they have?"

"To tell you the truth, a good bit of his journals are ramblings about life under the ice. I think he was starting to go a bit stir crazy."

"*Starting* to go crazy?" Brae teases.

I grimace. "Oh, I'm sure he knew what he was talking about. But he had it all up here," I say, tapping my forehead. "A lot of his research was probably in these complex data files, which were lost in the EMP. He probably had mappings of a lot of the reactions,

far more detailed than I was able to decode from our last vantage point.

"But that's the thing Brae, it's a timeless question. These things are so alien to us. It's only natural we aren't able to even tell if they're living, or simply geological anomalies. Back in the middle ages, they thought flies and vermin spontaneously grew out of rotten meat, because they lacked microscopes to view the growing eggs."

"That and a healthy dose of religious indoctrinization."

"Yes that. We've been brought up in the scientific method, rationality and skepticism, all these good things. But we have the same prejudices and biases and flawed intuition. Which is probably why these crystal things are so difficult for us to wrap our heads around."

Brae pauses for a second, looking at her hands, turning them over in the dim light. "Do you ever think we aren't meant for the stars, to travel out to these alien places?"

I cock my head, frowning.

"I mean, look at us," she says. "We're so frail and helpless. Our skin is soft, our organs weak and fickle. We require the tiniest fraction of temperature and pressure conditions to survive. Remember those old movies where the aliens would arrive on earth with their spectacular technology, leaving behind a wide swath of destruction, only to crawl out and die. They would turn out to be

squids or sickly gray men. That's how I feel sometimes, venturing out to these places."

"Like a squid? Or a sickly gray man?" I joke.

"And what about my baby?" she cuts in, ignoring my smile. "Our baby? He's going to be born on this pod, this simulated atmosphere, this partial gravity. What if..." she trails off, leaning forward, sucking on her lip.

I place my palm behind her back, rubbing it softly. She begins to gently shake with stifled sobs. "It's ok," I whisper, letting the friction of her synthetic shirt and my palm build, massaging the heat into her back and neck. "It's going to be ok, Brae. Let's take it one day at a time."

She nods slowly, painfully, black curls draping forward to cover her face. "Ok," she whispers, barely audible. "Promise me this," she continues. "Let's not fight again. I know we'll have troubles. But don't let it fester. Don't turn your back on me. Stay with me."

I breathe deeply, watching the shadows on the corners of the pod interior, the blinking LEDs bleeding red and green against the polished surfaces. Behind the supply cabinet sheet, white flashes pop out and dance, like the dozen angry flashbulbs of a paparazzi mob. Brae leans against me, her soft warm cheek sliding slowly along my sternum, into my lap. She is exhausted, but her

breathing is still fevered and anxious. Her fingers twitch in anticipation.

"I promise," I say, in a voice so soft it nearly catches in my throat, but bubbles forth, deeper and stronger than I intended.

It is her signal for release, and when I hear her lungs slow to a gentle rhythm, I too can fade into unconsciousness.

ϕ

The child grows inside her. Her belly bulges, rounding out in an expanding curve, stretching her skin taught. I see her emerging from her morning blankets, fabric sliding off the smooth round rise, catching for a moment on the nub of her bellybutton. I fell to her then in a swirl of giggles and fuzzy fabric on skin.

"Feel," she whispers, holding my ear to her belly. "He's kicking."

"He?"

She cocks her head in a curt little smile. "Yes. He. Only a little man would be so rambunctious. He woke me up twice last night, dancing on my bladder."

"So that's why you were getting up so much," I say. I feel a quiver under my fingertips, near the south end of her bulge. "That it?"

She gleams. "Yes. He's reaching for his daddy,"

Along with the fetus in her womb the coating of crystals grows, expanding in tall stalactites from the covered portholes, rising out of the deep abyss.

γ

There are visions of earth I miss, now that the adrenaline of the initial survival has worn off. Time drones, and for every weighted moment of tension there are thousands of tedium.

I remember the only autumn I spent with Brae on the east, driving an old two door up the coast, staying in rickety old bed and breakfasts, paint peeling off the graying shutters, ancient hoary oaks canopying the front lawn. Touching down at the base of the elevator, up out of the warmth of Florida, through the haunted towns of Savannah and Charleston, stately grandeur in Virginia and DC, then the city sweeping bustle of Manhattan.

I remember walks on those long straight avenues butting against the flat greenery of Central Park, orange and yellow blits of dying foliage wafting by. I remember the sound of the leaves against the pavement, the gentle scraping, the blowing of the wind through the naked black limbs, the thick crunchy piles in the gutters and sidewalks.

I remember watching the sun rise out of the Atlantic, the crisp taste of the morning air, heightened by the cry of gulls. I

remember the smell of the steamers drifting by, billowing black smoke. And their foghorns, low and echoing warm against the towering mirrored panes.

I see these moments now as slices of time, single points glowing brilliantly, like distant stars. I can do little with them, but watch them reel past, untouched and unyielding. The light they shine has little relevance on my current situation, except to reveal the warmth and beauty we lack. But I can connect their locations in the vast time spectrum of my life, that gray amalgam of sound-clips and video-reels that is the past.

I remember after we were packed to leave New York, a final morning walk on the streets. It was cold, and the brisk wind had brought with it a bite from the north, glitters of frozen rain on the masonry. We had fallen into a lull of conversation as we walked, heads down into the gusts, shielding our eyes from icy needles. It was the first of winter, and we were drowned in silence save the howl of the wind. Even now the foreboding in that morning is fresh, threatening to suck us under, grind us into the rough cracks of the world.

η

I'm dreaming again. For a long series of nights I slumbered without visions, a meaningless unconsciousness. Brae's struggles

with the life inside her often brought me up from under in the dark of the night, as she turned and stumbled wearily to the head.

But now it is gradients of gray and white against the black of my mind's eye, shifting pattern shapes and movement. At first it is only abstraction, indecipherable from the uncountable motes of dust settling along my corneas.

Then a spark, birthed as dull red, warming to an orange, peaking to yellow, blinding white, spreading outward like a towel soaking a stained puddle. The color fills the sponge of my mind, the universe of black seeping away into the diverse spectrum.

I zoom, outward and up, enlarging the patterns into concrete lines and curves, until a series of crystals surround the colored ball. Jagged and uncut, the matrix is vast, stretching far beyond the corners of my dream vision. Yet the color is at the heart, beating and vibrant.

There is red, deep and sluggish, like blood. It seeps from the center into the crystals, and they drain it outward and away, along the towering weblines. There is orange and yellow of fire, flickering as the feeble light of a candle. Another set of crystal chains absorb that light, stretching and extending its hue to the horizon. Blue and green and purple and silver follow, diverse and varied as the entire spectrum, pulsing outwards along the crystal pathways and roads. Outwards into the wide universe of otherworldly life.

When the color has equalized, and every transparent crystal has drunk its fill of hues and shades, the pulsing central sphere begins to expand. The beating increases, like the breathing of a frightened infant. It stretches and distends, sprouting odd bulbs and appendages. It curls over on top of itself, like a bean, four tiny buds along the sides.

It is then I recognize the distinct shape of a human fetus.

It continues to grow, features filling in and maturing. The nubs of hands dividing five ways into fingers, the rough globe of the head rounding into nose and mouth and eyes. It spins in a sac of fluid, but still the crystals pump the colors, distributing the liquid life outwards.

Then a rush of waters, and visions cascade by, almost too quickly to recognize, each one fading into the next.

Brae's face, coated in sweat and pain, eyes closed and pleading.

Hands, frostbitten and bleeding, sawed into bloody nubs.

A man, falling through the air slowly, steaming with a black, acrid mist, flailing headlong into a deep abyss.

A pit of steaming fire, ever churning under a billion tons of seawater.

An oblong metal pod, beaten and dented, drifting downward into the dark press of the underocean.

The same pod, now swallowed up by a nest of colorless crystals, towering high. The images freeze for a moment and I begin to approach the trapped pod, swimming. As a rush of bubbles race past, my vision is blurred and I once again see the colors and the unborn child. The fetus is transposed on the pod, the tiny beating heart centered on the living quarters.

For a long moment, silence, the drowning press of the underocean, the sloth-like upward expansion of the crystal towers.

And then the eyes of the child open and the scene is instantly washed white.

I wake to the dark and the warmth of her next to me.

ι

"Brae," I say, sitting next to her. She is barely dressed. The clothes she had brought are overstretched and tight over her belly. The gray fuzzy blanket is draped across her shoulders, folding into a lumpy mass on her lap. "I had one of those dreams."

"What dreams?" She cocks her head, letting a black strand fall between her lips.

She munches it idly.

"You were telling me the other day. About the network, the lights outside. You saw them in your dream."

She nods, gazing away, thinking.

"Well it was like that. Except it didn't start with the nodes or the moon-wide network. It started small, a ball of color. I couldn't tell what it was at first, because it had all these colors inside, swirling around and changing. Red and blue and orange. It was pulsing, like a tiny heart.

"The crystals starting sucking out the colors. One chain would take the red, another the green, until the entire network was filled, like a sponge soaking up water. And then the ball started to grow, tiny little nubs and indentations on the sides. It was a fetus."

Brae turns to me, still. She had stopped chewing on her hair. "What happened?"

I shake my head. "Nothing really. The baby continued to grow, until it was nearly ready to be born. Then it opened its eyes, and the crystals exploded in light."

She doesn't say anything.

"What's wrong Brae? It was only a dream, you know. I'm sure there is some metaphor behind it, something unconscious, but you don't think..."

"Cal," she says, slowly. She has gone pale. "I had one just like that. But it wasn't a baby. It was me in the middle. Not a baby, but me, getting fat and pregnant, and those crystals were sucking the color out of me."

"Color? So you were painted red and green and blue and orange."

"Yes," she hisses, interrupting. "It was strange. But no stranger than anything else that's happened to us. But think about the last dream, with the entire network attempting communication. It fits doesn't it? It's able to talk to us now."

"Through dreams," I say, incredulous.

She nods.

"But that's...that's impossible."

"You said yourself there's so much we don't understand about these things. This life. You said yourself we have biases coming into this thing. Notions that get in the way of seeing the big picture."

"But how?" I say. "There has to be a logical explanation. A scientific theory to explain it."

"Remember where your logical explanations got us last time," she says. "What would Robert think? He's the dreamer."

"I don't know," I say. "I'm sure he'd have some idea, some fringe theory."

"Well I know one thing he wouldn't do, and that's sit around and fret about it. I didn't know him that well, but I know he was a man of action. He'd put his nose to the grindstone and figure this thing out."

"Assumptions," I begin. "We have to start with some assumption. First - that the lifeform is trying to contact us. Second - the dreams are a form of communication. Since we've

both had them - that backs it up a bit. Now what about the similarities? The colors. The crystal network, stretching way out, enormous."

"The child. Growing inside me," Brae says.

"That too. So it knows you are pregnant, and there's some significance to it. What about the colors? They're moving from the center point - the child - into the crystals. The crystals taking something away, some essence?"

"Or some information," Brae says. "You said before it uses the light for communication. It distributes information along the pathways using color as a signal."

"So what information would an unborn child contain? What would it know that this network wants?"

We are silent for a minute, staring off into the shadowed corners of the pod.

"What about the fact that the baby is in the center of the dreams, the focal point?" Brae says. "In my other dream, the pod was just a minor distraction on the tip end of the network. Now the child is the middle, the core."

I shake my head. "It's all very confusing. Maybe it will try to speak with us again tonight."

"Maybe," she echoes, curling under the blankets.

φ

Roberts Journal
Thoughts on Death, circumventions, and what lies after

I have been thinking of death lately. In this place of cold and solitude, one would think it to be a logical extension of daily musings. This is not the case. The regimen of daily activities to ward off the cold guards against this sort of thinking. Yet today was one of quiet contemplation, watching the cable reel out on the underocean probes, the frost collect in the outer antechambers.

I remember my grandfather. My memories of him are as a frail man, old and weary. There was still a hint of fire in his Irish blood, a spark under the layers of crusting flesh and wispy red hair. But by the end, the dementia had overcome, and he become like a child. Those were sad days, not as much for my young self, curious and wide eyed, but for my parents, the caregiver of this kind dying soul.

It was then I first began to contemplate death. Where would my grandfather go, when they finally laid him the ground? Would his spirit rise to the heavens, to join the uncountable trillions of others who had gone before him? Would he wander the earth, restless, watching those who would come after? Or would there be nothing? Had the spark that had appeared so vibrant and alive been nothing but an illusion, a deceiving trick of the flesh?

Of course, I had no way of knowing, along with everyone else. Most adopt a philosophy of death based on what they have been told, the traditions that are passed along as much for sanity as salvation. I could have easily adopted the glowing promises of an afterlife, along with the fine practicing Catholics of my household. There would be golden streets and crowns and luminous light, like a grand Rubens painting.

But that didn't sit right with me. When I looked out at the universe, to see the wonder of life, I couldn't accept that answer. Could the words of men truly reveal that which lay beyond? And I certainly couldn't accept that arbitrary decisions of dubious morality would knock off some otherworldly conditional, routing souls either to paradise or pain. The conclusion of death would persist for all, or for none. There were no divisions.

It's a shame Goddard was unable to complete his dual-consciousness experiments. It would have shed some light on the age old materialist debate of the Brain-Mind problem. If the mind is merely an extension of the brain, does the mind die when the brain dies? Immediately? Or does it merely stop, frozen in the final throes of memory and consciousness? If it's the latter, heaven and hell would have a proper analogue - those with heavenly thoughts upon death would be eternally "there." Likewise for those with hellish torments.

But if the mind is not merely the brain, then that line of thinking becomes unreliable. A man once measured the weight difference between a dying man and his corpse, determining he lost 21 grams at the point of death. The weight of his soul. The experiment was overturned as a hoax, but the myth persisted, and the faithful masses still veer to that side of the debate.

Here's another thought experiment. Human life can be maintained following any number of horrific accidents. There was the case of an asteroid miner burned to a torso and head, little else, kept alive on ventilators and artificial organs. He was able to speak, think, but not move or eat or drink. He was certainly alive, and could have stayed that way for a good many years. Instead he decided to phase off into a gaming rig and let his machines power down. For him, the function of his physical body was more important than the "life" inside his head.

Others are the opposite. Wracked with paralysis, deformed and misshapen, Hawking lived out a life in his head. Even when granted the chance of regenerative surgery, he declined, knowing the mortality risk was too great. He wouldn't risk the life inside his head for one of walking and standing.

So which is it? Where does the life live? In the brain? In the muscles and tendons and bones? Or the soul?

For the miner, his soul was the strength of his arms, his ability to use tools, move amongst the free floating rocks. But for

Hawking, his soul was manipulating the mathematical models of black holes and quasars and dark matter.

Their souls were their internal model of themselves. Their soul was who they saw themselves to be, and hoped others would as well. And when the two failed to synchronize, death followed soon after.

Yes, the flesh of both eventually gave away. The cells shriveled and dried up, fell away. The brain tissue moldered in the skull cavity, either incinerated or consumed by microbes. But the soul can live on, because it is a model, a framework. Information. The flesh is but a trifle, something that is grown in vats and manipulated like disposable machinery in all the best medical schools. But the soul is something that can live forever.

It may be impossible to overcome the weighty pull of the flesh, for it is a weak temporal vessel. But for those who are confident, who have cultivated and harvested a soul and shared it with others, it's like the old Irish prayer. "Death is nothing."

For that, my grandfather is immortal.

ϰ

"Well," she says, shuffling out into the main living quarters, the gray blanket over her naked shoulders and trailing behind her like a cape. "We've been here six months. Think we should celebrate?"

"Sure. Too bad we don't have anything to toast with. Think those synth cultures could ferment?"

"If you're willing to toast with a concoction nastier than disinfectant, get to it. I'm happy with a fresh tea bag. Maybe I could bake a cake," she mutters, moving over to the small refrigerator that stores the extract from the biosynth generator. "Supposedly one of these cultures can squirt out gluten."

"Oh yea?" I ask. "What's that good for?"

"It's the protein in flour that gives dough its...doughiness. Key for any anniversary cake."

"We don't have an oven or anything."

She shrugs. "Settle for sugared crepes and cream?"

I smile wide and she shuffles over, facing me, the naked white of her flesh against my chest. I push the blanket from the corner of her shoulders and it fall to the floor of the pod. It moves somewhat slower in the partial gravity, like dramatic cinematography.

The bulge of her belly now extends past the curve of her breasts, which are bloated and flushed against her chest. I lean over and kiss her neck.

"You look beautiful," I whisper.

"You think?" she asks, self-consciously. "I've always heard men find pregnant woman attractive. Why is that? We're stretched out of shape, fat, our skin is bad, and we're moody as hell. What's to love?"

"This," I whisper, poking her navel. "Him."

"Him," she echoes, softly, almost on the edge of a laugh. "He likes to stand on my bladder. Jump up and down on it."

"He'll be a rambunctious little rascal. Given any thought to names?" I ask.

"No," she says, frowning. "It's strange. I have this mental picture of him in my head, sleeping away in my womb, and he's so peaceful and content. I can't think of a name that's appropriate. Every name has connotations, strange connections."

"Well, that's kind of the point. Otherwise we'd just name people made up words."

"Oh, I don't think so. Some names just have a nice ring to them. Cadence. I like Michael. David."

"Why not Patrick, ye ole Irish lass, you?"

She pushes against me, a weak punch to the bicep. "You sound like Robert."

"There's one."

"Robert?"

I nod. "It would be appropriate."

She looks away. "Well, we don't even know..." she begins, nervous.

"If it's a boy? Yes. There's always Roberta."

She punches me again. "I'm not *latino*! But ok. I'll consider it."

I hug her, feeling the life shift and pulse between us. It is almost as if I can feel the miniscule heartbeat through the thin line of flesh, the few inches that separate us from the third member of our family.

I think on the significance of the name, the common tradition of naming newborns after the recently deceased. Paying homage to the dead has always been an odd practice for me, but I think Robert would understand. He had a better grasp on the process of death than me, and he was willing to go. The thought of death fills me with terrible dread.

But Robert was alone in the world, abandoned on an icy moon off the deep end of space. Death in a place like that is somewhat to be expected. On the other hand, I'm recently married, in love, with a family to look forward to. In the relative spectrum of human lifetimes, I'm at the prime. Death lingers, of course, but I shouldn't fear it. That's for the sickly, the daredevils and the decrepit.

Brae pulls me to the floor, but I suspended her in the soft sea of the blanket, watching her sink down. Her face is relaxed yet her eyes are focused, boring into my own gaze when I meet hers.

"There are other ways to celebrate," she says seductively, "than cake and champagne."

"You'll have to educate me," I say, rolling to my side, running my bandaged fingers along the round rise of her profile. I watch

her chest rise and fall with each heavy breath, the sensual mound of her belly hibernating under a fold of gray fuzz.

"Do you know I love you," I say.

She pauses for a moment, contemplating her answer. It is somewhat unnerving at first, the silence and lack of immediacy. But when I think upon it, I am happy. She is reflecting on my love, the closeness we share, that intimacy. She is absorbing it, digesting it, assimilating it.

"Yes," she finally says, her lips skimming across mine, trading water molecules by osmosis. "Love," she whispers, half her mouth already in mine.

She runs her finger roughly through my hair, the edges biting at the roots. Then her nails are raking lines along my shirtless shoulders, the sheer physicality of it immeasurably sensual. I move my hand to her but she takes control, pinning me to my back, hands above my head. Her tongue is a lethal viper, leaving weeping kiss wounds on my cheeks, earlobes, nipples and father south.

When her legs straddle my hips, she becomes a goddess. Her spine approximates a roiling sine curve, clenched hands to the surface, face frozen in a rictus of glee. I melt into her, and for a few moments, we are one.

λ

What is Love?

What becomes of the luminosity I feel at this very moment, this rush of feeling and heat and burning desire and passion? Where does it go when the night grows cold, and the ice presses close around? Does it dissipate with the slowing of the surrounding molecules, with the dwindling energy under the world, in the vast deep? Can it live in the heart of darkness, alone from it all, with only a faint companion light? Can it find the light of love she calls her own?

I can hope.

μ

Robert's Journal
What's in a name?

I struggle with names. Just today, I found a new crystal node type, one that doubles back on itself in a gradual curve. The edges approximate a Mandelbrot fractal. It was certainly a legitimate discovery, something to be noted in the journals and records. But I couldn't think of a proper name.

I wanted something that was appropriate, not a mere latinization of my own surname. *'Occonoris'* is so contrived and arbitrary, but I've considered using it before. It won't do resorting

to my discoveries with roman numerals or some other systematic convention. Logical yes, but comforting, no.

Galileo did that when he discovered Jupiter's initial moons. His first titling convention was the names of his beneficiaries, the Medici brothers. But that fell out of favor among his peers. Cutting edge astronomy was no place for namedropping shills, and Galileo conceded to name Io, Ganymede, Europa and Callisto I, II, III, and IV respectively. Of course, the names didn't last, given the enlightened predilection for hijacking Greek mythological figures to stand in for celestial bodies.

When we give something a name, we are creating a place for it in the mind, a latch to hold onto the effervescent idea. There is much to be said of the tale of Adam in the garden. Given the task of naming the creatures of the planet, he was metaphorically granted a very human talent - abstraction. Naming is the essence of abstraction, encapsulating a physical object with a word.

Without abstraction, we'd be simple animals, able to do little more than satiate the physical drives of consumption, excretion, reproduction. Abstraction is required for language, and most probably they evolved together.

Names are abstractions, and thus points of light in our minds. When the corners of the light are revealed - be it through the senses or contextual clues, the light fires. The surrounding nodes flicker and flare, bursting alive in response. The entire complex

pattern fires off, a billion disparate brain cells entwined for this brief moment, emerging together into a vision, a song, a lost scent, a story.

ν

Her belly looks ready to burst. The mound is white with tight stretches, veritable tears in the soft fabric of her pink skin. I try to provide comfort, padding the sharp corners of the pod, bringing food and water to her. She does not move often, perhaps a few minutes a day to stretch her legs, crack out the kinks in her joints. But most often she is sitting, cross-legged against the living quarter wall, her belly rising with each breath beneath the mound of blankets and sheets.

"What have you read about delivery?" I ask on a slow afternoon, between meals and the peaks of the crystal bursts.

"Some," she mutters, struggling to get comfortable.

"Lamaze and all that?" I ask. I don't know the first thing about having a baby.

"No," she says. "The medical details. From a physician's point of view. Not the mothers."

"There's nothing in the database about it? First aid manual? What about the compiled encyclopedias?"

She shakes her head. "It got corrupted in the EMP. At least the video instructions did. I know the basics. I did work in a med center for two years, remember?"

"Administrative," I mutter. "You handed out cold medicine. What do you know about delivery?"

"I watched the miracle of life on the public nets."

"We might as well be in middle ages!" I rasp, exasperated. "We should work on this. At least get some sort of plan worked out, for when the time comes."

"Like you had for our Ganymede approach?"

I lick my lips. "Still harping on that? It's been eight months."

She brings a finger to my mouth, silencing me. "You survived frostbite. I can survive this."

"We can survive this," I correct, catching her nail in my incisors.

o

Robert's Journal
The Evolution of Story

Henry Ford once said "History is one damn thing after another." And in the mind of an industrial businessman, intent on the steady progression of his assembly lines, it would have been a fitting quip.

For the cold rationalist, Ford appears correct. There's no invisible hand moving history, aside from the collective will of the market. But I tend to think in stories.

What about lives? Are they simply one damn event after another? Given, much of life is filled with the mundane, the drudgery of simply existing in the physical world, satisfying physical drives for consumption, excretion and lust.

But those events are forgotten, much like the lightyears of cold vacuum between the stars. We see and focus on the points of light, and they are strengthened by the contrasting fields of black, not diminished.

When humans first gathered in small tribes of hunter gatherers, connected by the tenuous bonds of primitive language, their leader was the elder. The storyteller. For while the young and robust males could hunt game, and fertile females could rear the next generation, it was the storyteller who could bring meaning to their toil and pain.

It is not surprising the creation myths of all cultures have been embellished into fantastical tales. They are simply the most effected stories – honed and evolved over thousands of retellings and generations. Yet even the myths hold strong truth - fossils of a primitive past.

Take Adam in the garden - in a perfect state of nature, Lock's noble savage. As the world is revealed, he is granted the gift of

names, he gains dominion over his environment. This symbolizes early man moving beyond animalistic scavenging to organized groups, aided by language.

When he finally eats of the fruit, he becomes fully human, for his mind has revealed morality. No longer are his decisions relegated to animalistic impulse, but they can be abstracted into right and wrong. Finally, with that knowledge comes the inevitable - the memory of pain, the foresight of death, toiling for mere life. He is metaphorically cast out of Eden - the garden of animalistic innocence.

And what about our own lives? We too create our own myths and legends. Events are emphasized and emboldened. Pieces of information are carefully tucked away. We meticulously rearrange the details of memory to match the overriding story of our lives.

There's nothing wrong with it. It's perfectly natural - a human impulse to embellish, to intonate, romanticize. We do it precisely because we want our lives to be more than one damn thing after another.

In the sliced instant of time we live our lives, more often than not mundane and tedious, it is the story that threads along the moments. When the spark of the moment dims and the slice of the present fades, the story will persist – a beacon shining out and forward into the cloudy, unknown future. Events are noted,

actions are important. But it is our stories that will drive our lives and resonate when we are gone.

π

What is love?

It is the shared story of two souls.

θ

Her water breaks when we are sleeping, a wet gush that spreads down from her naked entwined legs to wake me, cold and bleary eyed. In a few moments, I throw on a pair of shorts and flip on the light, bright and overhead, painfully forcing open my pupils.

"Get the first aid kit," she says, calmly, already feeling the onset of a contraction. She sits still, legs propped halfway to her belly, back against the hard metal corner.

"Here," I say. "Let's get you comfortable. The navchair…"

"No," she says. "The navchair won't work. Too upright. Let me stay here." The corners of her face tighten as she grimaces through another muscle surge. "Get out the kit."

It's nearly medieval in its composition, the array of tools she's gathered for the procedure. There's a pair of pliers, fitted with a smooth plastic paddles to use as a speculum, sanitized in boiling water for a good five minutes. A small razor blade serves as

scalpel. And then the syringe and long needle, fitted with rubber tubing. Brae managed to rig an IV drip of the painkiller for a makeshift epidural.

"It'll be a while," she says, breathing slowly, deeply. "You can take a look if you want."

It's strange to approach her organs in this non-sexual, medical context, and when she is spread raw beneath me, it's nearly unsettling. Her vulnerability is profound.

"Shine the light," she says, gesturing to the lamp. "You should be able to see the cervix at the top. It'll be a small opening."

Squinting one-eyed, the wet, pink flesh looks to be an insignificant barrier to withhold the life within her. For a moment, she strains, and I see the tiny ring expand, pulse with the beat of racing blood. And there - white skin, mottled with dark lines. Hair. The head of my baby.

"How many centimeters?" she asks.

"It closed up," I reply.

"During the contraction," she says. "How wide did it get?"

"Maybe a centimeter. I saw his head. The hairs on his head."

She doesn't respond, so I look up, her face shrouded in the contrast of lights. She swallows hard, squeezing her damp eyes.

"Brae," I say, moving closer, running my bandaged fingers along the skin, longing to feel the damp goosebumps up her navel,

between the soft freckled valley of her bosom. She licks her lips, watching me, eyes twitching intently and loosing a pair of heavy warm tears. "It's happening," I say. "You're having a baby. You're going to be a mother."

She nods, reaching to wipe her eyes. But I grab her wrist, gently moving it aside, instead sucking the tears away. Her mouth meets mine, and we kiss through a heavy contraction.

ρ

The hours turn rhythmic.

There is a steady progress of contractions, continued dilation. After four hours, she's at four centimeters, and letting out tear soaked screams with each push.

"I'm going to do the epidural," I whisper to her. "It'll get a lot easier for you."

She nods, twisting slightly to her side. Her naked back is streaked with sweat, lines of the blanket fold notched moist red and pink.

"Right above the small of my back," she whispers through gritting teeth. "The needle should lie on top of the spine, but not touch it. Don't push too hard."

"I won't honey. Just relax."

She holds her breath as I push the point of the needle against the skin. For a moment, the skin resists the point, then it punches through, a gleaming line into her backbone. I empty the syringe and she tenses, feeling the chemicals move into the blood supply of her lower back, seeping into the spinal column. Then her legs spasm for a second, tiny shakes of her nerves firing one last time.

With her jitters the entire pod rumbles. I look at her, seeing the concern behind her eyes. Another earthquake or volcanic activity couldn't come at a worse time.

The pod-wide shakes die for a second, and Brae lies on her back, head limp against the wall. "Run the tube into the needle. Start the drip."

The remainder of the painkiller is inverted and suspended from a makeshift IV drip, a piece of shelving I managed to bend and weld into a sturdy hook. The rubber tubing snakes downward, through a couple of safety clamps, into the needle in her back. A few snips of tape finish the job, the rubber tube running high along her vertebrae to finally part at her neck.

"Sit tight, babe. I'm going to check what those shakes were. It was probably nothing, just some crystals settling."

As I rise, she holds out her hand. It's damp with perspiration, flushed red from exertion and squeezing, but still beautiful and delicate. I crouch and hold it, interlocking our fingers.

"I love you," she mouths, squeezing softly. I nod, echoing her pantomime and pulsing my palm. Then it's to the navroom and the front portal.

The underocean is alive with light. When I remove the central window shield, I can see the crystals towers that have grown since we shut ourselves in. They are magnificent, wide and solid, rising in fantastic geometric shapes. Thin columns support splitting trunks and pyramids, tall spires tipped with globes of fractals. Because of the lessened gravity and the gentle cushion of slushy water, the crystals can grow in miraculous formations, seemingly illogical and alien.

And through it all run the lights. They are not the typical cycle of blasted white, but a slow pulse of red chains, running outwards. The timing isn't perfect - certainly more sporadic than the normal expulsions. It's as though it is tied into a beating life, organic.

The red of the crystals seeps into the pod like street stoplights on a rainy night. They cascade over the sheer corners and walls in a bloody waterfall, back through the living quarters and into the stockroom.

"Cal," I hear Brae cry. "That light. It's timed with my contractions."

I rush back to her room, turning to watch the long crimson glares dance and seep away. She suddenly grabs my wrist and

squeezes, signaling the cervix muscles are pulling wide, opening. Crystal light floods the room, angry and violent, fizzling in pain.

"It is," I say in amazement. "You're in tune with them. The dreams..."

"I can feel him," she says. "He's wants to come out. He wants to be born."

"Push," I urge, a hand on her straining belly, feeling the strong abdominals tighten beneath my palm. "Push, Brae."

Her face is grimaced in fury, lips snarling bestial, single strands of soaked black curls stuck to her cheeks.

It is an hour of intense concentration, dedication to the very physical act of birth. The head breaches, pale, almost purplish. Brae screams. Her limbs vibrate and flop weakly to her side. I see the face of my child, eyes shut and sealed with the thick fluid of the womb. The nostrils and ears and nose are perfectly formed, like miniscule plastic figurines, newly pressed from the mold.

The pod begins to shake, like the faint rumbles at the onset of labor, but growing louder. I ignore it and focus on Brae and the child still being born.

"Almost done," I encourage her. "Push again." She strains and kicks, gurgling desperation through her locked teeth. "Push."

The arms are free, with them fingers, fully formed and infinitely fragile. The rest of the infant comes quickly, squeezed in

a rush of slime and red water, the umbilical cord flopping purple like a dying snake. A swipe of the razor and it dangles free.

It's a boy. I hold the newborn up, dangling wet from my bandaged hand, gifting him with a quick smack on the back. He coughs and breathes, sucking air for the first time, responding in a tiny living scream. The very base of the pod begins to shake, and the light from the crystals is a constant stream of red, shot through with bolts of orange, yellow and purple lightning.

The baby is a damp, mottled thing, its face scrunched in lumpy caricature. Its lips are red, still stained with the blood of the womb. New. His hands reach up to grasp, struggling to rise beyond their limited range of motion, for the first time hindered by the flesh, by gravity, trapped and moving in a world beyond the dreams in the womb.

I wrap him in a small blanket and present him to his mother, even as a fountain of blood erupts from her legs, soaking the blankets beneath her. She doesn't even notice, pressing the swaddled form to her heaving breasts.

"Robert," she whispers, running a tired finger against his tiny nose. "Little Robert."

And then the babe opens his eyes.

They are twin suns of white, straight from the inner pupil to the fleshy lids, radiant illuminating light. Brae gasps, shocked. Robert blinks, strobing the entire room for a brief instant, enough

to notice the creeping blaze from the navroom. I scramble to sop up the bloody pool that coats the floor, find fresh blankets to wrap Brae in.

But the pod will not stop shaking, and it is no longer a low level bass rumbling, but clattering of metal pipes and ducts, machines and sensors. There are cracks and moans, then the shredding scream of the outer hull, the very skin of the pod giving way.

I'm into the navroom, mouth agape as I see the first hole, spouting pressurized water into a fine icy mist, coating the navchairs and console. A white crystal follows, nearly opaque with dense interlocking chambers and inner silicate organelles. It moves slowly, growing outward to soak up the mist, creaking over popping metal faceplates and shelving.

Then another, a loud bang as a dagger spine pierces the HUD console, a severed band of optical cables impaled on the tip. Frozen steam coalesces along the growing silicon lance, instantly refreezing into a dozen icicles.

My jaw aches. There's nothing we can do. I shuffle back to sit with Brae. Her mouth is stuck in a perpetual smile, but her eyes betray a sad fear. I think she knows this is the end, and she'll have only these final moments of joy with her baby.

"He has your nose," she says. His eyes are closed, and we can examine the small nose, the dimples in his pudgy smooth cheeks,

the reddish-brown hair that coats his damp skull like fine fuzz. When he opens his eyes the room is flooded with light, and we are forced to look away.

"Something happened," I say, when I can look at Brae again. "There's some connection between Robert and the crystals. They made a link."

She shakes her head. "Maybe." Then she gestures to the edge of the room, where a bulge of ice-coated silicon is roiling over the metal. "But it's too late now. I love him anyway."

Already the pod is growing colder, the ice and water from the underocean filling through the tiny gaps created by the invading crystals, sucking our small pocket of warm air away into an equilibrium of frozen death. I pile the blankets on Brae and the babe, watching her cheeks flush red in the biting air. A faint breeze is picking up, caused by the temperature differentials in the navroom and storage chamber. I shiver and lay back, exhausted.

A crystal spike enters the pod above us, and with it the agonizing drip of frozen water. I bite my tongue, tasting the bitter iron, the thick red blood on my teeth.

"We tried," I say to Brae. "We really did. We made it ten months. That's something."

She nods slowly, almost serene. I move a thick sheet over her head, catching and diverting the seeping mist. "I'm sorry," I whisper, hunching down with little Robert, squinting when he

opens his eyes to look at me. Through the cracks of my eyelids, I see him reach out his tiny hand, grasping with uncoordinated, newborn fingers. I extend the nub of my thumb, and he catches hold, pulling me closer.

Something passes between us, something tingling and electric. It is though every nerve in my severed thumb is standing to attention, alert and absorbing unfathomable information. It verges on pain, even, but more so it is entirely alien and new.

"Do you feel that?" I ask. "He touched me, made me tingle."

Brae nods, smiling tiredly. "Yes. He can do that. I've been feeling him every time he opens his eyes. It goes through my whole body, those tingles."

"It's like there's something behind it. Like he's trying to send us something, talk with us. Like every nerve in my finger is a conduit."

"Yes," she say. "Something like that. He knows things, but I don't think we're ready to understand."

"What?"

"Remember the dreams? The light moved in the same way into me. That pulse, layered and detailed. And you said the light was conveying information, communication for the nodes. It's the same."

Robert opens his eyes, and we are forced to turn away. The entire room is whitewashed in a high contrast of gray and red and

overriding pale void. I can still hear the crystals expanding and cracking, like the sound of distant crunching ice. But the mist has stopped, as though the holes have been plugged and we are once again encased, the skin of the pod made whole.

"Robert was the focal point of the dreams, right?" I say, thinking aloud. "So he was a conduit between your mind and the crystal nodes. He can speak with them, he's part of them. Maybe it goes both ways."

"What do you mean?"

"Maybe we can ask him for help."

"How?" she asks. "He doesn't understand speech yet. I can't broadcast my thoughts to him."

"Maybe you can," I say, looking her in the eyes. "Try."

She closes her eyes, biting her lip in intense concentration. She holds little Robert against her body, the folds of the blanket concealing the bare damp skin of her chest, the tiny hands and feet of the babe. I put a hand on his tiny head, gently, feeling the red fuzz and soft skull beneath.

And I close my eyes, intoning some connection. I think of the void beyond our entrapment, the vacuum abyss between the worlds on which I've lived. I think of the warm sun, rays beating through cotton cumulus clouds, the roar of surf on the western shore. Anything.

A flash of a vision. I don't know if it's some slice dredged from the recesses of memory, or some alien communication with my son. But it's a fragment of the dream, the matrix of lights, multicolored and pulsing and beautiful, feeding from the unborn fetus. Except now the babe is born, splayed naked on a flat surface, arms and legs extended like da Vinci's vitruvian man. The crystals pulse red in time with Robert's shallow breaths, and every so often he opens his eyes, white light pouring out in radiant shards.

The pod shakes again and I'm broken off from my vision. But Brae doesn't move, fixed in her gaze. I can see her eyes twitch beneath thin, tired lids, like REM sleep. She's dreaming again, in tune with Robert.

Breathing deeply, I fall back into the darkness behind my own shuttered eyes. The vision returns where it left off, my little son once again closing his eyes, painting the scene in a pulsing circulation of red crystals, oozing lifeblood and seeping placentas.

And I see us, Brae and I, tiny and tired once again, old and haggard and caught in the pull of death. We scream inside our heads but face doom in sober honor, dignity.

I see my life in slices, each frame wheeling by too quickly to hold and examine, only long enough for recognition, and the sad truth that it is fading. The seasons of earth. The feel of the summer sun, the press of the baking heat on my shoulders, the

sound of scraping autumn leaves. The crunch of snow and the slick smoothness of ice. The taste of a first kiss.

Brae is there, in black and white photographs, the contrast of her hair and white freckled skin. She is joyful, giddy, dancing with the lens and shutter in my mind. I see her in the dim sparkles of the Christmas tree, wine on our tongues. I see her in profile, hair blowing, driving her new skimmer low across the water, under the suspension bridges and power lines. And I see her making love, watching with bemused eyes, grinning with silly expressions of pleasure.

And Robert is there, watching as well, absorbing these memories. He is taking them in, an exchange of information, a transfer of light. In another place, there is a tremendous crack, and I am suddenly cold. But I do not open my eyes. I do not leave this place of communion with my son, this link between memory and conscious. I do not want to leave, for in that other place the flesh falls away, the warmth seeps into the surrounding molecules, dissipating exponentially into the vast underocean.

I see us all now, the three of us, bound by luminous strands of white light. It is like a fine thread, tiny nodules of glowing silver, tinged with the dew of ice. We embrace, and the surrounding crystals begin to crack, to part before us. We begin to rise.

As the world around fades into a snowy hum, I think back to the grainy video of Robert, in those last minutes before he met his

end. He turned the vidlens, his face stoic, calm, but his eyes were driven. Those were the eyes that led him to that place, the coldest forgotten corner of the solar system, and even there to find miraculous life. Even there to confront the streaking fire from the sky, watch it pulverize the very atoms around him to boiling plasma. Even there as the comet penetrated the icy crust and dove into the underocean, blessing the strange silicon crystals with the spark of life.

Little Robert is before me, and his eyes are open. I look into those eyes, and beyond the fragile beauty of his newborn features, I see my old friend. That drive, that power, that intelligence. And somewhere in there, love.

I await the cold sting of drowning water in my lungs, but instead I hear her call. "Cal. Look at this."

I squint, but the room is no longer blinding. Robert's eyes have dimmed, but seem to glow gold with fire. Brae is watching the tiny porthole in the living quarters, in the starboard side. The metal shield has been knocked away, replaced with a twisted mass of transparent crystals. A thin coat of water pools on the floor, dripped from the melted ice.

"We're rising," she says. "Look at the lights outside."

I stumble to peer outward. It is as if the entire underocean is in symphony, a billion pattern storms cascading downward to the

abyss and returning back to our pod. We are ascending. The tips of the attached crystals blink feebly, like a massive docking ship.

The water is growing lighter, thinner as it loses density. Long stalactites of ice drift downward, the undersides of icebergs and frozen mountains - their smooth curves lit by the nodes like ghostly valleys.

And then we pound through, the pod creaking and moaning, the crystals crunching through the upper ice. For a moment, darkness, as we are surrounded by the thickest part of the ice, frozen for millions of years.

When we break free the ice gasps, belching steam and crystals high into the thin atmosphere. There is light here, but the node storms are lost beneath the churning waves. We continue to rise, moving into the upper atmosphere, away from Ganymede.

Back to the sun.

Ω

Brae sits solemn, strapped into the padded side chair, luxurious by our standards. The backdrop of blood brown Jupiter and Io is receding. She holds him in her hands, running her fingers along the rise of his head, through the fuzzy patch of red.

His eyes have grown dark, pupils rounding out into black orbs, fragile blue irises. His heart no longer beats, breath frozen in his lungs. But Brae is not ready to let him go.

I watch her as she weeps silently, the round drops lifting off to seek their own trajectories. All I can give her is a warm hand on her shoulder, rough bandages gracing her neckline.

"I'm sorry," I whisper, glancing to the babe. He had lifted us from our frozen prison, out from under the ice and into the dead space between orbits. A passing freighter had picked us up. They were incredulous to our story, even as the weary crew pried off the solid crystalline structures holding the hull together.

Robert had grown weaker as we moved farther out, distancing ourselves from the massive moon. The freighter's doctor was overwhelmed with the readouts, and his limited equipment was little help. The tiny infant passed when Europa came into view, the spindle of cracks rising swiftly from the crimson Jovian horizon.

She concedes to a burial in the void, a small casket set adrift through the airlock. Before release, I set a vector - Robert's first camp, the site of the comet impact. Our son will return home.

We watch the porthole as the casket drifts, spinning ever slowly into the void. She reaches over, finding my damaged hand.

"We're letting him go," she says. "Our savior."

I breathe deep, considering a response. I exhale in silence. He was our savior, the burning eyed infant who lifted us from the cold confines of the frozen dark, back into the light. He was the dream manifest, the living bond between my consciousness and a life unknown.

Someone once told me 'Death is nothing.' Robert's returned from where he came, to where he belongs. Beneath those frozen waves.

"What about us?" I finally mutter, when the casket finally merged with the endless stretching dark, beyond my humble vision. "Where to now?"

"Home," she says.

"Where's that?" I ponder aloud. "We haven't been earthside in nearly two years."

"Someplace warm," she says, ducking over for a short, conservative kiss. "Mr. California."

"I suppose one day we'll look back on this and smile," I say. "Our time under the ice."

"Maybe," she replies, squeezing my hand. Then she turns away from the porthole, framing the constellations behind. "But that story is yet to be written."