

The Gift of the Stone Astronaut

Hello Hai, my love. The stars have been duller than they've been in months—they don't shine like your eyes did in those late, dark, blue hours of the evening after sunset. I told you before how the rings of Saturn caught my breath the first months I got here, but now they just make me miss you stronger. I want to be Saturn so you could be the rings, wrapped around me. It's hard to swallow that I've been on this two-toned, two-bit rock for two years come next week, and I can't even comprehend how I have three more left. Two years of overturning pebbles, surveying ridges, and analyzing dust—searching for something in the numbers that I don't think we'll ever find. Three more years of chasing a ghost that either simply doesn't exist or will never let us find it. Three years of gray, white, and black, and smelly scientists trapped in this can. I'm going crazy here, and it's only with thoughts of you that I can stop myself from floating off.

Mar's breath made little clouds in front of the display as he sat up in his bunk. The research outpost of eighty people was very small. He rubbed his hands for warmth and then massaged his temples with his thumb and index finger. It was very late and preparations for the next eva (extravehicular activity) started in five hours. In four hours he'd have to give up his bunk for the next shift. "Forty beds for eighty heads." But most importantly, the only return probe to Earth for

the next six months was getting sealed in three hours, and so this had to be finished quickly.

Nothing feels settled here. I mean it when I say I can feel every month, minute, and second between us and when this mission is finally up. Please, please forgive me for going out this far, it was stupid and selfish! I really thought I could find some great answers, but there's nothing here. I really miss being able to talk to you in real time and I wish there was enough free bandwidth to get more videos of you and the house. I loved so much the one of you in your yellow sundress making grilled cheese sandwiches. The whole thing warmed me up and when I closed my eyes, I swear the smell of them wafted all the way up here. I'm so happy that I can finally send you a little present.

As Mar finished up his letter, he was careful not to type too loudly: a hard-learned habit from living with Hai while typing out his graduate thesis late into the cool nights. She used to turn over in bed and kick his desk chair. It always felt too hot during the day in their dusty ranch house in the Valley for Mar to work comfortably, which made him figure he'd enjoy being in space. "new methods for the detection of astrobiological trace molecules in extraterrestrial ices." He thought, why not? Being that far from the Sun is like being in night all the time and the capsules have climate control. And it's cold on Iapetus, so no bugs.

Mar crept out of his bunk and stepped onto the aluminum floor of the hab module in stained socks. Everything was so cold. For a few weeks when he first arrived, his toes cramped up at night, but now the calluses from the long evas across the mountain ridges kept him insulated—the same way the outpost was perched on stilts to keep it off the nitrogen-cold floor of the moon's surface. He used the handrails on the ceilings and walls to tug himself down the corridor toward the break room—in the low gravity he hardly weighed fifteen pounds, though his muscles had atrophied. Thomas and Zhíqiàng were sitting at the table of the break room, awake

and deathly quiet. The first looked up from reading something on his computer, and the second looked down into his warm coffee when he realized it was Mar who had come to disturb their silent hour. Mar latched onto a handrail and swung gracefully towards the storage lockers.

“Hey guys, how long until the return probe lifts off?” he asked, even though he’d memorized months ago the exact time it was scheduled to reascend into the darkness. He opened his locker as Thomas glanced at his watch.

“You have... an hour and ten minutes,” said Thomas, and his eyes turned back to his readings.

Mar took out a plastic box inside of which was one of his shirts, bundled up tightly. He delicately unwrapped it to uncover a little figurine, six inches tall. It was a painstakingly carved astronaut, fashioned in the same eva suit which kept Mar alive on his research excursions. Its proportions were a little off—it was too chubby, one arm was longer than the other, and its helmet wasn’t properly round, but it was recognizably of Mar and made by Mar—a labor of love. He swaddled it back up into the box which he held close to his chest. As he continued off towards Docking 6, he whispered a “See you guys later,” to Thomas and Zhíqiàng. The first grunted a “Yup,” and the second clutched his coffee closer and let out a cloudy sigh.

Here, every joule of energy was precious. Solar panels on such a small and distant outpost were ineffective, so electricity came from miserly radioactive sources which had to be replenished all the way from Earth. A hot cup of coffee was hugely special, the closest thing some could get to a warm companion. The cold permeated them down to their souls, and the low gravity threw everything into slow motion. The relay satellites which orbited Iapetus and its banded master relied on similar power sources, so broadcasts back to Earth were prioritized for scientific data—the one bountiful thing this far out in space (even if Mar felt it was all useless).

Personal communications, letters, pictures, and videos were bundled like mail into weekly lump transmissions. Management decreed it also kept everyone focused on their work. As Mar floated down the corridors towards the return probe, his message to Hai sat in the outpost's systems, waiting impatient to be sent home.

Docking 6 was close by; Chloë was stationed by the umbilical tunnel which joined the return probe's storage compartment to the outpost. She was processing the last personal items when Mar floated up to her, his box in hand. His heart was beating strongly. He gave the box a soft kiss and handed it to Chloë who smiled at the warm gesture.

"Don't worry, chéri. It will get to her safely," she reassured him with a hand on his shoulder. They stood for a second as the quiet moment passed through them both and then Chloë turned around. Mar peered behind her into the probe's cargo hold. Overall, the return probe was about the size of the white school bus which had picked him up from his dusty house and ferried him away to the airport in Los Angeles. It was mostly filled with rock and dust samples collected by the research team which needed to be send back for further analysis. No chance to be a stowaway on a probe without life support. Chloë shrink-wrapped the box and then affixed a barcode. Mar swallowed and shuddered, and he made his way back to his frigid bunk for a short nap before another shift on the frozen moon.

Out on the ridge, Mar looked up and tried to see if he could spot any of the orbiting satellites, but the Sun, glaring like a far-off spotlight, made it impossible to see anything faint. He turned back to his team members bent over like cotton pickers and in turn continued his work. Far off below him, a panel on the outpost slid open and a delicate communications array blossomed into the daylit night. It trained its crosshairs on Com-2 and, silently and invisibly, Mar's words to Hai flashed through the vacuum. They imprinted themselves on the gold and

silicon memory of the satellite, which then aimed itself at another spot in the sky. With the rings of Saturn shining in the darkness, the satellite screeched in digital staccato eighty woes, joys, and aches, recorded faces, hugs, and lullabies toward a blue droplet almost a billion miles away.

Among them, Mar's words stampeded towards the Earth.

There's no such thing as fresh air here. The air feels dry, like the cold mornings on the mountains we could see from the house. I keep getting nosebleeds. I miss the humidity of our beach trips in my lungs and the dust of your hair and our tatty couch on my skin. Outside, there are no clothes to tear off, no windows to open, no bugs to accidentally let in, no monsters in the night that we can huddle against. The nights are frozen dead.

The transmission was caught by an array in Australia, exactly on schedule. Its journey had attenuated the signal strength to hardly an electric whisper, but the words and lullabies and cries arrived intact. They zipped along gold lines, copper cables, and fiber tubes to the computing centers in Los Angeles. The messages were processed, any sensitive material was culled, and the hearts' contents of eighty souls were repatriated to parents, partners, and children across the globe. Two hundred miles to the north, Hai sat at her kitchen table in the pale dawn with a glass of iced tea, compulsively refreshing her inbox. The dust was getting worse and it would be another dry and windy day. She sighed, a little worried, and stood up to lean against the wall next to the window. She looked up at the clouds, taking sips of her tea, though she didn't know where Saturn would be from her point of view. Her computer dinged and her heart leapt. She opened the message and a smile reached across her tired face. Her eyes began to water before she read the first word.

I know that things have been hard on Earth, and I can't wait to come back and help you. I've made you a little doll of me out of some lovely rock I found in the Roncevaux Terra. I'm out

here, working hard, but now a part of me will always be with you! It's a little crude, but you know it's just rough and tough like me. I set it on the return probe which should arrive in about a week, I think. I hope the rains come back soon, the droughts sound awful. You were telling me it's been really hot. There's lots of dry ice here, more than I could ever want! I'm staying warm though, and the evas will be a little more interesting once we move our analyses into the darker Cassini Regio. I do envy the mini-me through—it makes me happy picturing you holding me again. He'll be brave on his journey home.

Hai wiped the dust and tears from her eyes. Her hands felt numb and she pushed her palms into the table, sitting up and taking a deep breath. The anxiety of waiting for a successful transmission had knotted her stomach, but reading Mar's words calmed her and her appetite crept back. She got up to the kitchen cabinet to get a cookie from her ration box, which she nibbled on with her tea while she continued to read the letter.

Mar was asleep when the return probe was finally ready for launch. He had wanted to stay awake and see it off, but two sleepless nights in a row would have been too much for him. Despite his excursions set to muscle memory, he knew that one mistake on an eva could cost him his life, and writing his letter to Hai helped remind him of his personal conviction for working—and someday returning—safely. The return probe had been double- and triple-checked by the engineers on the outpost. All the diagnostic tests were finished and the tanks were pressurized with liquid hydrogen and oxygen, hydrolyzed from water ice deep in the rocks. In the final countdown, the return probe was in the hands of the computers.

It lifted off with a little rumble. Inside the hab module, Mar turned over in his bunk, dreaming deeply. Behind his tired eyes, he sat with the stone astronaut in the return probe. The probe lifted off from the surface, its engine exhaust scorching the ices below it. It pitched slightly

to the side, trained on a calculated point towards Saturn. It accelerated, drifting out from Iapetus's fingers and swinging in, towards, and then around and past the ringed giant. Safe in space above the planet, Mar watched the beautiful banded clouds whipping past each other. Its storms roiled like Polyphemus as the probe distanced itself from the windy shores and its main engines shut down.

When I first got here, I wished I could truly show you the beauty of Saturn. I know we poured over pictures of it together before I left, but they don't do it justice. To see the rings, just out of reach, terrifying in their perfect geometry... I coveted them. I wanted to pounce, pin, and frame some sample of that wondrous, ghostly thing and offer it to you, to repay my debt for the years of us together lost. Now it haunts me when I sleep and I'm scared it'll follow me home.

The internal computers hummed along, its antennas blurted out status updates and its gyroscopes and motors prepared themselves for the odyssey before them. On queue, the probe unfurled an immense golden sail and announced it was ready to the laser array in polar orbit around Saturn, which had slowly begun to shrink behind it. The sensors in the orbital array squinted into the darkness and then trained themselves on the probe, and, like a lighthouse, fired at the sail. Mar awoke with a jolt—the lights of the hab module were turning on for the next shift and bunk rotation.

The probe felt the soft breeze behind it. The laser continuously pushed on the sail as the probe began to creep faster and faster. The pressure of the immense light was weak, yet cumulative. The probe moved like a glacier, then like a stream, then a torrent, a bullet, and a lightning bolt. The laser array shut off, its heat sinks glowing red like tiger stripes, and the probe still hurtled onwards. Its inertial guidance systems tallied each moment of acceleration, tabulated every second, and the probe began a lazy backflip. The sail was very fragile and so the probe

took a few hours to fully turn around. Instead of beelining towards the Sun, it now fell backwards faster and faster, out of the abyss of deep space. Tucked safely inside, the stone astronaut moved away from Saturn and its moons and ice and the frozen outpost where it was born, and towards a new and dusty Earth.

I wish marking my calendar for the day I come home made that day come faster. Instead, that day is floating far out in space waiting for us to bump into it. When it's down to a few months away, I'll look into the sky to where you are and I'll imagine the Sun's warmth on my skin and how close you'll be. But today and tomorrow and the next day, when I peer up into the darkness, I see a thousand other stars and I'm scared I'll lose the Earth among them. You feel as far away as they are. They don't twinkle. When we used to lie out in the dirt on the mountain trails and gaze up, we could dream together because the twinkling and shivering of the stars let us know that the universe was alive, waiting for our imaginations to drift out into the Milky Way. But here, the stars are frozen and when they stare down at me, unblinking, I feel locked in a present without a future or a past.

The probe finished its somersault and Saturn and its moons shrunk until they were just another dot against the cosmic wallpaper. The Earth was still far away, an even fainter speck hidden in the glare of the Sun. The onboard computers kept their eyes focused. The Sun was getting closer, brighter, and warmer. In a few days, the probe would return home. On Earth, the control center computers fidgeted in their housings, waiting for the probe to get in range. In the Valley, Hai delivered coffee and took phone calls at the town hall, but she was distracted. She wanted to pick up the phone at her desk and be surprised by Mar's warm voice, crystal clear and in real time. She wanted to pick up the phone and feel Mar's hand reach from behind her and set it back down on the receiver. She wanted to pick up the phone by her bed and call in sick and roll

over and feel Mar lying next to her.

The computers in Los Angeles tuned in to satellite dishes around the world which scanned upwards until Madrid finally spotted the return probe, its golden sail gleaming in the void, right on course. Another orbital array, even bigger than the one leashed to Saturn, fired up its lasers and bore down. The stone astronaut shifted in its box as the first deceleration process began. The Earth sprouted from a dot into a disk, and then swelled into a marble—first quickly, then more slowly, until a day later the probe had been slowed enough to let its own engines take over.

Still, sometimes I look up and see one of the satellites drifting overhead and I remember that we can set our own pace for the cosmos. Just because the universe looks frozen in place, doesn't mean we're frozen in it. Our satellites keep their orbits, our schedules tick on, and my heart keeps beating, kept warm by your love.

Had the stone astronaut had a window, it'd have seen hurricanes and oceans, vast mountains and dust below it. It'd have seen the probe stow away its golden sail in preparation for the engine burn. The onboard computer whirred up the gyroscopes, and the probe aimed itself heat shield—first at the Rockies. Given the deceleration by the engines and the rotation of the Earth, the landing spot would be a cool splashdown in the warm Pacific ocean. At home, Hai took the curlers out of her hair and picked the pills off her dress. Clouds loomed over the mountains and it looked to be another windy day.

I know three more years seems like an eternity, and a billion miles is worlds away, but I'll be there soon, by your side.

The engines activated and the stone astronaut was pushed into one side of its cloth capsule. There was a thump and the astronaut was pushed the other side, and then the first side, and then back again. The stone astronaut tumbled as a gyroscope shattered apart and the probe abruptly

began to spin head over tail. The engines cut out as emergency procedures whizzed through the computer. The other gyroscopes throttled up and control thrusters fought the violent rotation but the stress was too much—the shock had ruptured the liquid hydrogen tank, which began gushing out a magnificent shower of ice particles into the vacuum of space. The computers in Los Angeles blared alarms and threw up warning lights, calculating outcomes and simulating contingencies. The probe's computers wrestled back heroically and the control thrusters regained control. The probe was stabilized, but uselessly out of fuel.

The engine burn hadn't lasted long enough and the probe careened towards the Earth. The computers oriented the heat shield, bracing for the end. The stone astronaut settled into its box. With the Rockies to the right and the Pacific to the left, the probe slammed into the upper atmosphere. Burning plasma welled up around it. The cargo shook and jolted, paint charred. The heat shield defended bravely but it was eaten up, blasted away like an icicle pressed into hot steel. The frame of the probe was pressed into itself and in an instant the tanks were crushed.

Driving on the highway towards the center of town, Hai looked up to see an enormous meteor overhead. She checked her watch and pulled over, stepping out of her car to witness the probe's spectacular return. A large section of the heat shield sheared off and the probe started to tumble again, splintering into smithereens before any gyroscope or truster could save it. Several tons of rock and dust samples were plunged into the re-entry inferno, disintegrating in the lower atmosphere along with the stone astronaut.

Look up at the sky, and know that I'm smiling. The dust will be over someday, and I'll bring you sunshine soon.

Hai gasped, her hands over her mouth in shock, unsure what she should do. The wind started to pick up and the clouds over the mountains drifted down into the Valley, towards the

trail of smoke and debris left by the probe. She looked upwards and a smile reached across her tired face. The clouds grew darker overhead, seeded by something in the pulverized rock strewn into the air. She felt a droplet hit her cheek and she opened her mouth and tears filled her eyes. Rain fell in the Valley and the dust began to settle. Hai leaned onto her car beside the highway, drenched in the pouring rains, and she just laughed and laughed.

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21W.759 Writing Science Fiction
Spring 2016

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