



**FALL  
2019**

**TOR.COM  
SHORT  
FICTION**

Laurie Penny

Michael Cassutt

Greg Egan • KJ Kabza

S. L. Huang • Lavie Tidhar

Brenda Peynado

Adrian Tchaikovsky

E. Lily Yu

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**LAURIE PENNY**  
THE HUNDREDTH HOUSE  
HAD NO WALLS

# The Hundredth House Had No Walls

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**L A U R I E   P E N N Y**

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*illustration by*

K U R I   H U A N G

TOR·COM 

# The Hundredth House Had No Walls

FOR NG AND AP

The King was bored.

For five hundred years he had been King of the country of **Myth and Shadow**, and he was a good king, if a slightly bewildered one. The **countryside rolled with treacherous forests rammed full of all** the requisite enchanted creatures, and stories grew wild and **weird in the fields**. The people were happy, even when they had to chase **their idle** daydreams out of the back garden with a broom.

The King lived in a huge palace that he had dreamed into being all by himself, full of dark, mysterious corners and fierce, beautiful courtiers and lovely young women with dark hair and flashing eyes who could dance on their points for a day and a night and never set a **foot fully** on the ground. The King appreciated all of it. He had designed it for his own appreciation. Still, he was bored.

He could **summon a few** of the lovely young women to sing and dance for him and **perhaps see to** some of his less strictly aesthetic needs - **but that** was just too easy, and anyway it always made him feel a bit awkward.

He could wander down to the Fields of Fancy and go on an absolute rager eating fairy fruit, and that might distract him for a decade, but it always gave him a brutal hangover.

He could do some work. Being **the** King of Myth and **Shadow** wasn't a lazy man's job. The stories weren't just going to write themselves - except, more and more, they seemed to.

The King was bored, bored, bored. He had everything a King could want, and he was still horribly, horribly bored.

He had never quite intended to become King. **That was why he** was good at it. When he had first arrived in the Kingdom, it was a grey and anodyne country, and he was a simple travelling bard and sometime

sorcerer looking to make his name.

**In fact, the bard thing had been the original plan.** The King of Myth and Shadow, before he became the King, was the seventh son of a seventh son, which wasn't a big deal, really, and he didn't like to talk about it, although it did prove handy on the road when busking fell flat to be able to magic yourself up a serviceable tent and a hot meal just by **wishing** it.

Barding was the job of choice for enterprising young men with good hair who wanted to see the world, back when the world and the King had both been so much younger. When he came to the grey and anodyne country, all flat marshes and chalk skies, he stopped at the first **inn**, **got** out his harp and **started pounding out a cover** of 'Venus in Furs'.

He hadn't even finished the song when the villagers begged him to tell them a story instead.

'It's not that you can't sing,' said the innkeeper's wife, who was a kind and thoughtful person. 'It's just that we don't get a lot of stories around here these days.'

'You don't?' said the young king, who was not yet the King. 'But I thought this was the land of Myth and Shadow?'

'It was, once,' said the innkeeper's wife, who was really too kind and too thoughtful to be stuck running an inn for a dull man who did not appreciate her. 'But as you can see, the Fields of Fancy are all blighted. We're lucky if we can harvest a couple of decent parables between us. The fairies and goblins are leaving the forests. As for shadows, there are hardly enough to fill the corners anymore. **[cut -Our exports are right down, and a]**All the kids are moving to the city to become accountants.'

'Times are hard,' the villagers agreed.

'Alright,' said the young king, and he started to tell a story about a storm of inspiration that rolled through a grey and lacklustre land, raining all sorts of wild notions down on the fields.

Immediately, a great gust of wind rattled the shutters, and the villagers ran to bring in the picnic tables.

'How did you do that?' cried the innkeeper's wife. 'It's raining free verse out there!'

'It's just a talent I have. It's no big deal,' said the young king, although he was secretly rather proud, and pleased to have made everyone so happy.

'Can you do it again?'

'Sure,' said the young king, and he started to tell a story about

doorways that opened to stranger lands where elves and centaurs and unicorns and vampires and witches and all the less popular long forgotten creatures had retreated, bringing them back to the grey country.

Instantly, the door flew open, and a harried farmer rushed in demanding strong drink on account of a griffon having taken up residence on his roof.

‘That was brilliant!’ said the innkeeper’s wife, putting the kettle on for some nice hot tea, because the young man was working hard and starting to look a bit peaky.

‘**Watch this,**’ he said, and he started to tell another story, all about a herd of wild shadows wheeling in from the North and taking up gloomy residence in the forests and crannies and all the too-bright places in the land.

And that, too, was suddenly so.

After a while, the people of the no longer grey and anodyne country asked the young sorcerer to become their king.

‘In principle, of course,’ he said. He had heard a lot about kings, mad kings and bad kings and kings who were worse still by virtue of sheer **spineless** incompetence, and **while** he didn’t know if he’d do a better job, he certainly wouldn’t do a worse one. ‘But shouldn’t there be some sort of election?’

‘No,’ said the innkeeper’s wife, who by this point was also the young sorcerer’s personal assistant, because he worked very hard, but sometimes forgot to eat breakfast. ‘That’s rather the point of Kings. If you want my advice, just give the people what they want. You’re good at that.’

‘My life is generally better when I take your advice,’ said the young sorcerer. And so he became king, and built the palace, and the land of Myth and Shadow continued to prosper.

Ten years passed, then twenty, then all at once five centuries had gone by and the King still hadn’t run out of stories. **They came to him easily as breathing and dying and falling in love seemed to come to everyone else.** Any time he wanted a new lover, a new toy, a new wing for his palace of Shadows, he simply thought about it and it happened. This, too, made the King feel awkward.

But more than that, he was bored.

He was bored of being rich and brilliant. He was bored of new lovers and new toys and bored of his palace, and he knew he shouldn’t be - after



all, he had been so very lucky. Any of his subjects would have killed for his problems. Somehow that only made it worse.

So the King decided to do what kings do in these situations and go and wander the world **in disguise as a** normal, non-royal person. He took only a small entourage - just twenty Knights of Wild Notion, plus their ostlers, servants and squires **most of** whom, as is traditional, were actually girls dressed as boys. It was really a very modest retinue, and the King could not understand what the fuss was about when they piled off the Acela Express at Penn Station.

The King had never really believed in New York City.

More precisely, he had always imagined it was no more or less a true place than the Fields of Fancy or the Forest of Wonder and Moderate Peril: a place sustained entirely by the belief of its citizens and the untold millions of dreamers who willed it into being every morning.

When he arrived, he found that this was true. New York was no less impressive for being mostly fictional. Of course, the place was lousy with writers.

The King felt right at home.

After a pleasant morning bothering the penguins in Central Park Zoo and a less pleasant afternoon getting hassled by tourists on the High Line, all of whom seemed to want his picture, the King found his way to a cabaret bar in the East Village.

He shuffled into the back with his Knights and ordered a cup of tea. The barman was about to explain that he did not serve tea when he was surprised to find himself in possession of a very fine earthenware tea set and a big jar of **Assam**.

The King sipped his tea, which was very good, and settled down to watch the show.

That was when he saw her.

Her hair was a rage of upstart red.

Her eyebrows were inexplicable.

Her dress fell from her shoulders in rolls of dirty white silk.

Her voice was rich and dark and angry, like just hearing it could crack open your chest and whistle through all the hardened dirt in the forgotten corners of your heart.

She was alone on stage. Just her and a piano. She played it as if she was trying to rip the song from **its teeth**, and the song was raw and true.

The King listened. His tea went cold.

The King came backstage after the show, after telling the doorman a story about a doorman's wife who was about to be treacherously discovered in bed with a doorman's sister. He didn't like doing that sort of thing, but needs must when you've just met your future bride.

There was a sign on her dressing room door. It read:

*The Princess of Everywhere and Nowhere.*

She was draped across an old couch, smoking a cigarette. Without the clownish makeup she was even more beautiful, her face a mess of exquisite angles, scrubbed bare and vulnerable.

'How did you get into my dressing room?' she asked.

'I'm a sorcerer,' admitted the King. 'It's what I do.'

'Well,' said the Princess, 'since you're here, you can get me a water from the fridge. Don't I know you from somewhere?'

'It's possible,' said the King of Myth and Shadows, handing over the water. 'You might have read about me in an old storybook, or met me one day in a dream.'

'I don't think so,' said the Princess. 'I mostly dream in music. Oh, I know! **It was an interview in Vice.**'

'Or that,' said the King, who had become uncommonly shy. 'I like your singing.'

'Thanks,' said the Princess. 'I like your hair. What was it that you wanted?'

'I wanted to invite you to walk with me through the endless Marshes of Unfinished Plots, where it is always a yearningly perfect late spring morning, and listen to the songs of the forgotten muses, and be my consort for a year and a day.'

Instead, they went to a sushi restaurant on St Mark's.

The Princess ordered yellowtail sashimi, so the King did, too.

'How did a Princess end up playing piano in the East Village?' he asked, spearing a piece of **fish**.

So the Princess told him.

'I was born a princess,' said the Princess. 'No slippers or spinning wheels involved.'

'My parents lived in a palace full of every toy a little girl could ever

dream of, and it pleased them to see me play with them. More than anything, though, they liked my sisters and I to play with the **dollhouse**.

‘It was a beautiful **dollhouse**, built to look like a real castle, with a ballroom and a kitchen and working lights, and a tiny wooden princess to move between the rooms. She was skinny as the sticks she was **made of** and she could sit up at the dining table or lie down on the bed or stand propped up against the wall on her tiny stupid feet, but she couldn’t run or dance or talk, and she was all alone.

‘I hated that **dollhouse**. I felt so sad for the little wooden princess who was imprisoned there. I would steal her out of the dolls’ house and keep her under my pillow so she could go adventuring with me in my dreams. I took her with me secretly to play my parents’ **piano**, which stood all alone in the great ballroom, untouched and unloved. But my parents were worried. A princess shouldn’t shout and scream and tear **strange** sexy music out of innocent orchestral instruments. A princess should play quietly with dollhouses. How else will she learn to keep her own house when she’s a grown-up queen?

‘So they built me another **dollhouse**. And then, when I hated that one too, another. There was a townhouse and a cottage and even a saloon, which the little wooden princess did enjoy for a while, but soon we got bored again. Eventually the palace was full of **dollhouses**, sprouting everywhere like sad wooden mushrooms, gathering dust. I hated all of them.

‘I was bored of being a princess, and all the things **you** had to learn to do - eat with your mouth shut, speak softly, suck in your belly. **And the list of things you had to learn NOT to do covered almost all the fun stuff.**

‘So one day I went out to the forest and set the little wooden princess free. Finally, she stood up and stretched on her wooden feet and spun and danced and told me she would miss me before she disappeared forever into the underbrush.

‘When I came home I told my parents I was leaving to become a cabaret singer. They were furious. Their rage ran red and hard and loving and I caught it in a silver dish and used it to dye my hair over the sink. Then I packed some spare knickers and ran off to Boston to start a band.’

‘Why?’

‘I was bored. I hate to be bored.’

‘I can relate,’ said the King.

‘What’s your real name?’ asked the Princess.

The King was momentarily bewildered. Nobody had called him anything but ‘Your Majesty’ for at least a century.

‘I can’t quite remember,’ said the King, ‘but I think it’s Colin.’

‘I’m Melanie,’ said the Princess.

The King thought that was the most beautiful name he had ever heard.

‘Want to get a hotel room?’ she said.

**And for the first time in a very long time, the King was not the least bit bored.**

★ ★ ★

The next night, the King was back at the bar before the band even started getting set up. The **Princess of Everywhere and Nowhere** was doing sound-checks with an upsettingly handsome drummer.

‘Can I help at all?’ asked the King.

‘Plug in that amp for me,’ said the Princess.

The King fiddled with the amp for forty-five minutes until someone took it away from him.

The next day, over breakfast in a run-down diner, the King asked the Princess to marry him.

‘Honestly, I’m flattered,’ said the Princess. ‘But I’m not really into the whole marriage thing.’

Nobody had said no to the King in a long time.

‘If you come to the land of Myth and Shadow as my Queen, we can feast together all day and night on every sort of sushi your heart desires. I will give you ten beautiful maidens to wait on you and ten handsome swordsmen to guard you and a golden piano to play, and you will enchant all the creatures of my land with your music as you have enchanted me.’

The Princess looked intrigued, so the King raised his game. ‘You will sleep on a bed of spider’s silk,’ he said, ‘and I will dress you in gowns of spun starlight.’

‘I’ve been dressing myself since I was six,’ said the Princess.

‘And aren’t you sick of it?’

‘You’re a very strange man,’ said the Princess. ‘I like it. I have to head back to the studio, but text me, ok?’

The King went back to his castle, gathered his most tenacious shadows

about him and prepared for a sulk that would go down in legend.

She's just a girl, he thought to himself. There are others.

But a chill wind of pathetic fallacy was blowing hard over the storyfields, and it whispered: *you're an idiot, and you're kidding yourself*.

'What do I do?' the King wailed at the innkeeper's wife. 'There's nothing here she wants.'

'Oh, you foolish man,' said the innkeeper's wife, who was no longer married to the innkeeper, and now ran a small vegan cafe in town. 'She doesn't want any of your treasures. She just wants you.'

The next night, when the show was over and all the hangers-on had finally left the party in the hotel lobby, the King climbed into bed. He curled his body around Melanie and started to tell her a story about a princess who grew up to be a cabaret singer, and a King who fell in love with her.

The King was nervous, because he'd never told this sort of story before. For one thing, the narrative structure was all wrong. For another, it had no ending to speak of, not yet, maybe not ever.

'Once upon a time,' said the King.

His mouth was very close to her face. Her hair smelled of cigarettes and vanilla.

The King of Myth and Shadow was no different from the rest of us in that he preferred stories to real life, which was messy and full of plot holes and disappointing protagonists. You couldn't count on real life to deliver a satisfying twist, just more complications and the **random violence** of everyday heartbreak.

But he carried on telling the story, whispering it in Melanie's ear as her eyelids fluttered closed.

'This one's good,' she whispered. 'This one's my favorite.'

They were married in New Orleans, on the Southern leg of her tour.

When it was done, the King took the Princess back to the **land** of Myth and Shadow, and dreamed up a whole new wing of the castle just for her.

Since the King had a whole kingdom and the Princess was living out of a tour bus, it made sense that she would move in. She brought her own retinue, a crowd of lost boys and girls with wild hair and weird ideas who liked to dress in stripes and lace and drape themselves listlessly across the furniture between sets.

'Where does she find them all?' said the innkeeper's wife, who by now

was living in a **small cottage near** the palace with a nice woman named Carol **who liked to go hiking on Saturdays**.

‘They follow her home like cats,’ said the King. ‘She doesn’t have the heart to turn them away.’

The innkeeper’s wife saw to it that little dishes of cream and vodka were left at strategic points around the palace, and the lost boys and girls were well pleased.

After a few weeks, though, the Princess became restless. She stopped eating her sushi at breakfast. She stopped speaking to the King at dinner. Great stormclouds of dramatic tension boiled over the land, and the lost boys and girls of the Princess’ court and the King’s Knights of Wild Notion hid in the cellar and behind **the** curtains and under the table to wait for the weather to get a bit less metaphorical.

‘What’s wrong?’ the King asked the Princess, after three days of dreadful silence.

‘It’s the house,’ said the Princess. ‘It’s so big and so beautiful, but it makes me feel like a wooden doll in a display case.’

‘But I dreamed up a recording studio for you,’ said the King. ‘Don’t you like it?’

‘Of course I like it,’ said the Princess, ‘but I like the road better.’

The King thought and thought. He couldn’t let the Princess be unhappy. When she was unhappy, he was unhappy, and when he was unhappy, the Kingdom was unhappy. If she was unhappy in the Kingdom, she must be unhappy with him.

Eventually, he hit upon a solution.

‘I will build the Princess a new palace,’ announced the King.

And so it was done. The new palace was next door to the old one, with a gleaming pathway cut between the limerick grasses that grew wild on the mountainside. It was even more beautiful than the first. Its turrets were spun out of lost screenplays and its galleries were haunted by the mournful ghosts of singer-songwriters who never quite made it big. The King was sure that the Princess would be happy now.

And she was, for a time. The Princess liked newness, and adventure, and she recorded a well-received album in the basement of the new palace. But after a few weeks, she became restless again.

The King thought and thought. ‘If she doesn’t like this one, I’ll build her another,’ he said to the innkeeper’s wife, who put her head in her

hands.

‘I know you’re trying to be romantic, but you’re approaching the question of female agency all wrong,’ she said.

‘What makes you think that?’ said the King.

‘Well, for instance,’ said the innkeeper’s wife. ‘I don’t even get a name in this story.’

‘How is that my fault?’

The innkeeper’s wife looked at the King for a long time without saying anything.

‘Alright,’ sighed the King. ‘I’ll put it on my to-do list. Right now, I’ve got a palace to build.’

The next palace was an enormous treehouse, built into the branches of the three tallest redwoods in the forest. The court had to be winched up in buckets or flown up on the backs of griffons, as there were no stairs to speak of, and an elevator would have spoiled the look of the thing. Walkways strung with fairy lanterns connected all the passageways, and the wind whispered dirty, earthy lyrics as it muttered through the leaves. Ravens and starlings and bright birds of paradise nested in the high eaves, and great dances were held on platforms in the canopy, where you could see the whole Kingdom sparkling in the endless starlight.

‘It’s great,’ said the Princess, ‘it’s really great. Let’s spend the week here.’

‘I was hoping you’d want to spend your life here,’ said the King.

‘Let’s come back to that question,’ said the Princess, taking him by the hand and leading him to bed.

By the end of the year, the King had built the Princess ninety-nine houses.

There were brutalist modern apartments and twee little cottages and cloud-castles built of **the sharp, lovely dreams of underpaid academics who really wanted to be novelists**. But still the Princess would leave, and go missing for days, and turn up in a dive bar a week later draped in reprobates and the obscene sweat of songwriting.

By the time she walked out of the ninety-ninth house, the King didn’t bother looking for her, and went to numb his heart for a little while in his library.

After a week, he was only a little bit worried.

After two weeks, the words swam and snickered on the page in front of



him, and he couldn't concentrate for worry.

By the end of a month, he was frantic. Where had she gone? What had he done wrong?

'What is any of it worth,' said the King, out loud, 'if I can have everything I want, but I can't have her?'

**The words hung in the air like obscure art on a gallery wall, and the King had a great idea for a new story.** He saw it all in his head. It would be a story about a boy, and a girl, and a kingdom, and a quest, and there'd be enough angst for a trilogy, and probably some sizzling gypsies.

The King picked up his pen.

The Princess put her hand down on the blank page. She stood beside him, and the room fell away, and they were on the steps of the castle, and the air crackled with electricity, and her rage was beautiful and terrifying.

'Stop it,' she said. 'Stop that right now. I'm not a girl in one of your stories. Don't you get it?'

'I never thought you were,' said the King.

The Princess raised one ineffable eyebrow. 'So why do you keep trying to write me into one?'

'Because I love you, and I don't want to lose you,' said the King.

She took his face in both her hands and kissed him.

'I love you too much to let you write walls around me,' she said.

'But what sort of story can I write you into, if it isn't one of mine?'

'You can't,' said the Princess, folding her arms in a way that terrified the King more than he could possibly express. 'I don't want you to write me into any story. I want to **make up my** own story. You can be in it, if you like, but that's all.'

'That's crazy,' said the King. 'Everyone knows my stories are the best. You'll mess it up. You won't get the ending right.'

'Maybe so,' said the Princess, 'but I want to try.'

'You'll skip vital exposition,' said the King. 'You'll put the plot twists in all the wrong places.'

'I'm pregnant,' said the Princess.

'You see?' said the King. 'That's exactly the sort of thing I'm talking about.'

Then he sat down on the castle steps and threw up into the geraniums.

'Colin,' said the Princess. 'Stop being such a drama queen. That's my job.'

‘The hundredth house is my heart,’ said the King. ‘Will you live there, at least?’

The Princess started to cry.

**‘I hate it when you do that,’ she said.**

Then she kissed him again.

‘This isn’t ever going to get easier, is it?’ he asked, a very long time later, when they’d come up for air.

‘I hope not,’ said the Princess. ‘That would **be boring.**’

‘You know,’ said Colin, drawing her onto his lap, ‘in all my life, I never met a **girl who** could match me.’

‘That’s funny,’ said Melanie. ‘In all my life, I never met **a boy who** could catch me.’

She laughed, and it sounded like the first chord of the song you loved most when you were young and longing.

Then she ran.

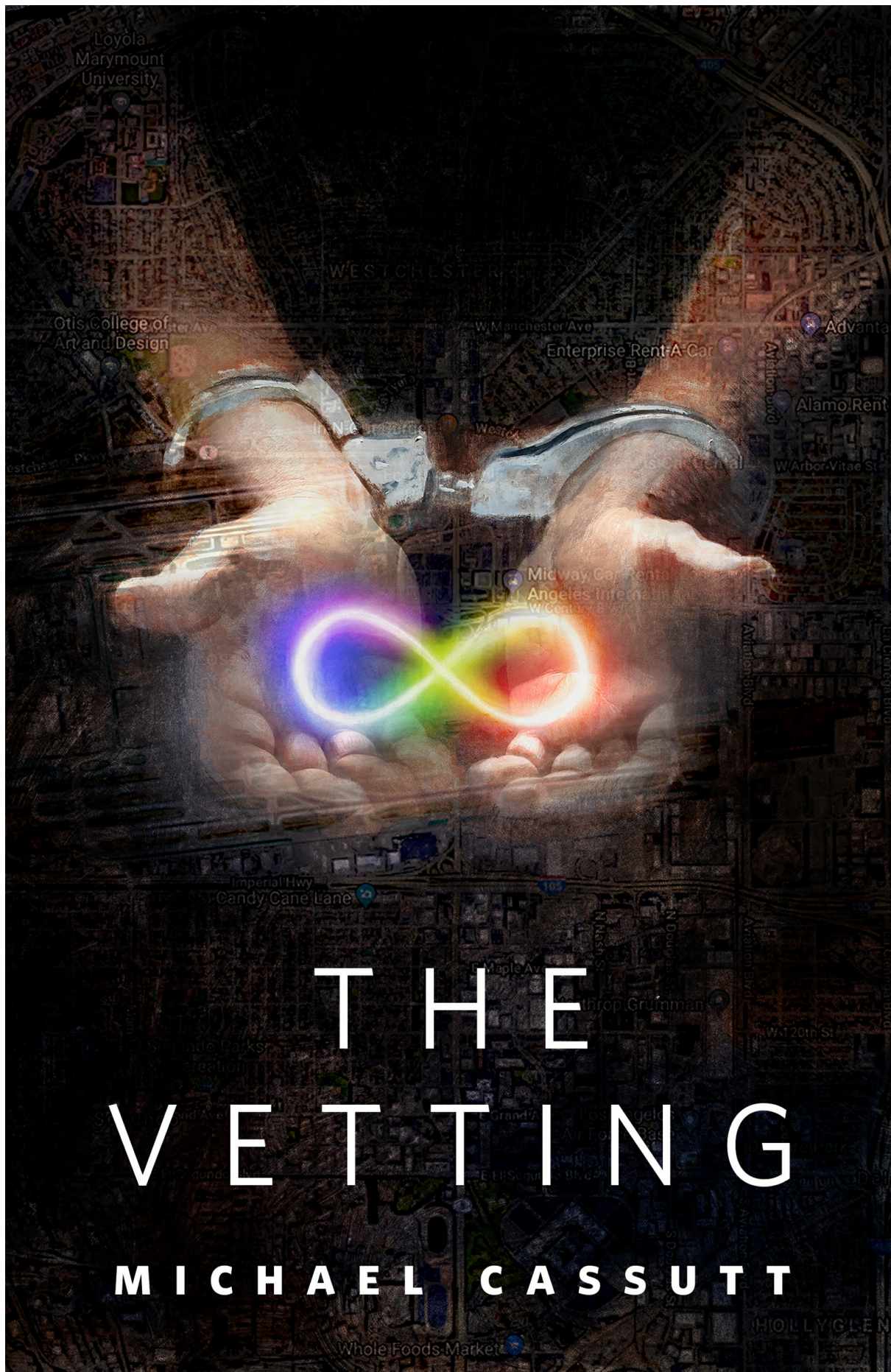
The King followed.

It wasn’t the end.



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# THE VETTING

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**MICHAEL CASSUTT**

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*illustration by*

ROBERT HUNT

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“Have you been here before?” The TSA officer, a tall African American woman in a baggy blue blazer, turns to punch numbers into the security pad.

He might simply say no, or not for a long time. Instead: “Tania,” he says, “it’s Jeff Bruno.” He smiles and holds up his badge with a photo that does not, in fact, really look like him.

TSA officer Tania Wilson finally makes eye contact, and is embarrassed. Bruno has been meeting clients at Los Angeles International’s Bradley Terminal for well over a year. Wilson has been his escort half a dozen times. Though, to be fair, not lately.

“Dear God, Bruno! I’m so sorry.”

“Well, I’m down thirty pounds and a head of hair.” And half an inch from his former five foot ten, and feeling thirty years older than his nominal thirty-two.

“Finally laid off the Cinnabon? Wish I could.” Bless Officer Wilson—remembering how they had met at the Bradley food court during the first wave of travel bans.

“Yeah,” he says, “gave it up.” Among other activities, like tennis, dating, planning for retirement.

Wilson nods. “So how is everything?”

“I’m still here.” He summons his standard brave face while knowing he is being self-indulgent. The cancer has been arrested. His latest scan was clean.

“Good. I was afraid they’d dragged you out of the hospital for this.”

“I bet every lawyer in the city is here.”

“It’s been gridlock for the past month.”

“Like every other day.”

“Not only the traffic and parking. Inside, too. Can’t get to the food court if you want to.” Bruno knows Los Angeles International, of course.

To avoid the congestion, he had left his car several miles away at WallyPark and taken their shuttle to Bradley Terminal.

Bruno follows Wilson down a hallway of closed doors bearing temporary signs saying CONFERENCE #1 and counting upward. With the constant din of the terminal muffled by the outer door, Bruno can hear voices, some calm, others raised, with each step. “Boy, you weren’t kidding.”

“Every one of these has been going 24/7. ICE teams all over the fucking place.”

“Maybe I can get my guy out quickly.”

“Oh, Bruno, your guy isn’t going anywhere any time soon.”

“Something he did?”

Wilson shakes her head. “See for yourself.”

Bruno juggles his briefcase so he can read his iPad. The office coordinator has just loaded the case file.

Ahmed Ruteb, age twenty-six, arrived this morning from Amsterdam Schiphol. Age was a problem, but origin wasn’t too bad. Netherlands, probably a refugee—

But—nationality: Syrian. “Shit.”

“I know, right?” she says. “Nothing but flags. How can you defend guys like this?”

“We don’t have proof that he’s a terrorist or that he even dislikes the US.”

“There never is proof. Until it’s too late.”

Bruno wants to lie down, and not only because of his physical state. He just knows this isn’t going to end well.

But he volunteered to help with the flood of refugees. And last year he’d been successful in freeing four and sending them on their original journeys.

He opens the door.

★ ★ ★

Sitting on one side of a table, like an arrestee to be questioned, Ahmed Ruteb is indeed a young man. Wearing what appears to be a repurposed US Army jacket and with several days’ growth of beard, he could also be the ICE model of a young terrorist from the Middle East.

Bruno introduces himself and reaches for the second chair.



He almost misses it.

Ruteb jumps up to help. “Are you all right?” Ruteb says. His English is good, with only a slight accent.

“Fine, thanks,” Bruno lies. He summons a smile as he arranges his iPad. “You are Ahmed Ruteb, you arrived in Los Angeles this morning on British Airlines 4569—”

“And was detained the instant I got off the plane, along with several dozen others.”

“—in spite of having a valid passport and a visa, I know.” Bruno struggles to smile. He really feels faint. The lack of fresh air is not helping. “As of this morning, there were seventy-four other people in the same situation.”

“I thought this expired. This ban. I was told this by the consulate in Amsterdam!”

“So was everyone at every embassy and consulate.”

“But not your TSA.” Ruteb blinks. His eyes seem tired. Bruno wonders when he’d last slept.

“How have you been treated?”

Ruteb shrugs. “No one has beaten me.” His voice suggests that he was about to add *yet*. Then he holds up his water bottle and sloshes it. “I have water. I will be hungry soon.”

“Okay, here’s what happens: I’ll take your information—purpose of visit, intended length of stay, host—then confront ICE. And get you released.”

“But I’ve already been ... what do you call it, vetted. I spoke with American agents in Amman long before Amsterdam! I’ve been waiting for seven months.” Ruteb holds up as many fingers on two hands.

“There are always conditions for admission, Mr. Ruteb. Even to a disco.”

“I am not looking to pick up chicks or buy drugs.”

Bruno regrets his statement immediately. “If we can retrieve your vetting information, that will help.” Bruno is finally able to focus on the iPad file. Maybe it’s time to increase the font. “Form I-94 unstamped ... You have a J-1visa, so were planning to be here six months?”

“Yes. Maybe less.”

“Purpose of visit—scientific research.” Bruno’s turn to blink. “You have a degree—”

“In mechanical engineering from the University of Aleppo, faculty of computer engineering. In Syria.” He pronounces it *soo-ri-a*.

“Lots of need for computer engineers.”

“I haven’t worked on computers for three years.”

“Because of the war?”

“I left Syria before the shooting.” He points at Bruno’s iPad. “I flew to Schiphol from Amman, Jordan. Jordan was not on the list?”

Bruno stares at his iPad. It is difficult to focus. “No. And interviews overseas don’t replace those performed here.”

“How was I to know?”

“None of us knew!” Bruno says. His turn to raise hands. “I’m sorry. It’s difficult. Let me be sure: You’re not applying as a refugee—”

Ruteb points at the iPad again. “For scientific research!”

“Okay. Where are you going? Who are you meeting?”

“Dr. Hannah Vindahl of the Lumina Foundation. This is in Malibu, California, I am told.”

“Is Dr. Vindahl expecting you? Was someone from Lumina picking you up?”

Ruteb fidgets. “I was to text them when I arrived and cleared customs. Or TSA.”

“So you haven’t contacted them yet.”

He spreads his hands, as if to say, *What do you think, you moron?*

Bruno does a quick Google search for the Lumina Foundation. Surprise—it isn’t a tech outfit at all, but some kind of New Age-y operation. Its webpage has fucking Enya on its soundtrack. “What is your interest in the Lumina Foundation, Mr. Ruteb?”

“I’m doing the same work.”

“In what field?”

Ruteb spreads his hands again. Bruno is beginning to find the gesture annoying. “The field of what happens to us after death. The science of the afterlife. NDEs.”

“And those are...?”

“Near-death experiences. In our case, post-death experiences.”

Death is a subject Bruno cannot escape. Not only is there his own very real final curtain, said to be “three to five years” in the future, but his father David had died five months back, finally succumbing after a stroke. The old “shock but no surprise.”

David Bruno is physically absent, his body burnt, his ashes scattered in the ocean, yet he is still a force in his son's life. As in moments like this, when Bruno smiles and says, "Shouldn't they be called PDEs?"

David Bruno would have said this, a superficially polite way of expressing contempt and anger. It would have been consistent with his opinion that his son, for all his intelligence and promise, was adrift, responsive rather than active, believing in nothing—

Not even his pro bono law work.

Ruteb's gaze is elsewhere, so maybe he hasn't noticed. Which allows Bruno to again concentrate on his experience with immigration cases, which is exclusively with war refugees.

Even with his kind, gentle words—gentler than his father's words, anyway—Bruno judges this mystical quasi-scientific business as borderline. Maybe over the border. What is he supposed to do with this information? How does it allow him to help Ruteb? Might he draw on some untapped pool of knowledge regarding scientific refugees? Or rather, pseudoscientific refugees. "I've never met a researcher who specialized in this particular subject."

"There are very few of us."

*Zero* is the number in Bruno's mind.

He needs help, or at least sympathy, and the best source is Gloria Chang, head of the immigrant rights task force. She is also his ex.

"What are you doing?" Ruteb says, seeing Bruno tapping the keyboard.

"Sending a text."

"Please, to Dr. Vindahl?"

"To my boss."

"Then to Dr. Vindahl?" Ruteb recites the cell number.

"Fine." Why not? It's the work of a minute to enter Vindahl's number, type two sentences, press send.

Before Bruno can decide how to endure the unpredictable wait for responses, Ruteb says, "This research will change the world, you know. It's why I risked everything to come to the US."

"How so?" Bruno asks—too quickly. Now he has to listen.

"My father is an Alawite imam. You will know that Assad and his mob are Alawites, so we were never openly persecuted. But there were very few of us in Raqqa, so we lived quietly.

"I was the fourth of four sons, and ten years younger than the nearest. I

think this might be why my father didn't push me to follow him. I was allowed to go to Aleppo to university. I graduated and began to work for a banking firm in IT.

"But I always had other interests, and the first among them was what is called the science of the afterlife. When I was very young I decided I wanted to know answers to certain questions. Does any part of us survive after death? If so, where do we go? Can this be proven?"

Bruno has been thinking the same thoughts, though more frequently during the terrifying days of his first diagnosis. "These aren't questions most young men pursue," he says, pausing every few words to summon the will to speak. "Something must have happened. Something triggered this interest. Your father's profession?"

Ruteb's shoulders slump. "My older brother Sayid joined the Islamic State. He became a martyr."

*Oh shit.* "What did he do?"

"He detonated an explosive vest in a market in Baghdad in 2009."

"People died?"

"It was reported as seventy-two." It takes all Bruno's power of restraint not to cite the number of virgins promised to Islamic martyrs in the afterlife.

"You don't believe it?"

Ruteb shrugs. "It was not that high."

"Were there any American victims?"

"Yes."

With a terrorist for a brother, Ruteb is never going to be allowed into the US. This entire vetting is now pointless.

Yet Bruno is compelled to wait for Chang or Vindahl to respond while he thinks again about death. Until meeting Ruteb, "going to sleep forever" has been the best imaginable. And during the worst of chemo, finding hair on his pillow every morning, eternal slumber hadn't seemed like such a terrible fate.

If nothing else, it would be sound sleep, unlike his nighttime experiences while "bravely battling" cancer.

Permanent lights out, never to know again, think again, be again ... frightening, for sure. But, like many people, the transition is what triggers Bruno's fears—the chest-rending pain of a heart attack, the brutal smash of an airplane, even the slow, wheezy fade-out of elder pneumonia.

“What did you discover in these post-death experiences? Heaven, angels? Does Allah come into this anywhere?”

Ruteb reacts as though Bruno had posited the existence of the Easter Bunny. “This was not a search for a creator or divine being; it began with physics. And we have discovered that a cluster of particles detaches from your body when living functions cease...” Ruteb rounds his shoulders as he gestures. “Like a breath being released.”

“Particles?”

“In a definable cluster. A soul.” As if Bruno were especially stupid. “It is physical and is absolutely part of the human body. How could it be otherwise? It can be measured and detected, though you need devices like those searching for the Higgs boson.”

Bruno smiles. “Didn’t they call that the Higgs boson the God particle?”

If Ruteb thought this was amusing, he hid it. “It has been measured by a Russian institute twenty-eight years ago.”

“I missed the news.”

“It was not reported because the country was falling apart and the institute disbanding. It had been started many years earlier by Stalin, they said. Part of a campaign to undermine religions.”

“Strange to think that it kept going for ... forty, fifty years?”

“Closer to seventy. You must know that such ... investigations have been going on for longer. A thousand years.”

“But hard physics or engineering—”

“We call it morphogenetics.”

Bruno has never heard the term. “Can it re-attach itself to another body, this soul?”

“We don’t know.”

Bruno smiles. “So there’s hope for reincarnation.”

“We are investigating. There are problems with that idea.”

“Such as?”

“The math. Go back a hundred thousand years, when there were a small number of humans. If in death they each became a new individual, wouldn’t we just have the same small number of humans?”

“Well,” Bruno says, feeling foolish but playing the game, “souls had to have another origin. And there isn’t some finite number of atoms in the universe. New particles form.”

“Yes. So souls might be formed the same way.”

“So, then, *maybe* to reincarnation.”

“We are still investigating.”

“You seem confident in your science.”

“The science is settled.”

“Why haven’t you told the world?”

Now Ruteb smiles as if talking to a child. “You, Mr. Bruno, are an intelligent and compassionate man. Yet you have trouble believing what I’m saying. Half of your country rejects ‘settled science’ about the environment! How many will accept proof that there is some existence after death—”

“More than will accept global warming.”

“You didn’t let me finish. We don’t only have proof that souls exist and survive. In some cases they survive after death in a damaged state, and in others—they do not survive at all.”

Now it is Bruno’s turn to stare. “I don’t understand.”

“Souls can be annihilated.”

Bruno has not yet registered this alarming statement when he hears a crash followed by a jangling alarm.

Ruteb jumps so quickly that he bumps the table, sending Bruno’s iPad sliding to the floor with a clap.

Bruno signals Ruteb to stay put while snatching up the iPad.

He rises from his chair—

—and faints.

★ ★ ★

He hears his father’s voice, no sentences, just the words *lazy, entitled, foolish*. Then he sees light, feels a hard surface under his skull, his shoulders. Hears the hum of an overtaxed air conditioner, the scrape of boots on flooring.

The voice of Gloria Chang. “He’s back.”

Bruno takes a breath, which triggers a spasm of nausea and blurring vision. Fortunately only for seconds.

He closes his eyes. Alive, yes. But he immediately thinks, *You wanted to know? This is what it’s like to die.*

Terrifying. Makes it almost impossible to breath. He more or less grunts one syllable. “Yeah.”

Gloria Chang and Tania Wilson are helping him sit up. He remains in

Conference Room #1, but Ruteb is gone. He nods to Chang, then, to Wilson, says, “Where’s my client?”

“Next door. He jumped you.”

“I fucking fainted.”

Bruno sees the quick glance between Wilson and Chang, who tells the agent, “Jeff isn’t the type to excuse bad behavior by a client.”

“I know,” Wilson says.

“He’s ill,” Chang says, with concern so genuine that Bruno almost forgets how cruelly she broke off their relationship two months after his diagnosis.

“Know that, too.”

Now Bruno turns to Wilson. “What was all the noise?”

“There was an incident.”

“I got that much,” Bruno says. “Was it an attack? Maybe some airline employee beating a customer, or—?”

“A false alarm.” Wilson frowns. There is something she doesn’t want to talk about. She nods to Chang. “Let me check on things next door.”

She steps out, leaving Bruno alone with Chang, who has retrieved his iPad. “Good thing you called. This is a global clusterfuck.”

“Thanks for rescuing me.”

“You’re doing fine—”

“Except for the fainting.”

She honors him with the full Chang, the sweet smile, the touch on the arm. Early in their yearlong relationship, Bruno had realized Chang possessed perfect control of her expressions and gestures; the best actor of the age. Combine this talent with startling beauty and it is a wonder she hasn’t been elected Emperor of Earth.

“What’s the deal with Ruteb?”

He gives her the highlights as he glances at the iPad and finds that Vindahl has not responded. “Wait,” Chang says, uncharacteristically surprised. “He’s a *death researcher*?”

“More precisely, a researcher into existence *after* death.”

Chang vanishes into her own iPad. Bruno can’t suppress a sigh, this simple gesture making him feel weak and old. Three years since the discovery of a mysterious lump in his neck—the first step in a series of tests and chemo news as terrifying as it was predictable.

The next stage, his crack cancer team lately informed him, is surgery

that will probably result in the loss of his larynx. And the prospect of, at best, five more years of steady slicing and inevitable decline into a drugged fade-out.

If Ruteb is correct, Bruno at least possesses a soul—something that will survive after the slicing, dicing, and irradiating.

And this is the best scenario he can imagine.

Wilson returns. “Come on.”

Bruno steps to the door, but Chang stops him, indicating her iPad. “I’ve got to check in with Drew”—another attorney from the project—“and this whole after-death science sounds crazy. It may be an attempt to turn you.”

“Turn me how?”

“Away from the law, into some kind of foreign agent.”

Bruno can’t believe what he’s hearing. “Don’t you think this is too obviously crazy?”

“There is your particular ... condition, Bru. Maybe they targeted you.”

“Our assignments are random. I could have been talking to any of a dozen other people who are hung up here.”

“Maybe they all had orders to use this shit on you.”

“That’s paranoid even by your standards.”

Chang just offers an indulgent smile.

★ ★ ★

In the next room, Ruteb is sitting at a desk much like the one in the other room, but now with the added bonus of shackles on his wrists. “That isn’t remotely necessary,” Bruno tells Wilson, who stands to one side, arms crossed, clearly nervous.

“He said he knew all about IEDs.”

“NDEs, actually. And you’re not supposed to be listening in, are you?”

Wilson stares, embarrassed yet defiant. “We thought he’d attacked you,” she says. “And I can’t remove the shackles until the agent in charge signs off.”

“Which will be—?”

“The moment he gets done with—”

“The ‘false alarm’? Come on, Tania.”

“Give me a minute.” She leaves.

Bruno places the iPad on the table and sits across from Ruteb. “Sorry.”



Now Bruno is able to see the bruises on Ruteb's left cheek, which looks swollen. "They finally got around to beating me."

"Someone will be punished, believe me."

"I will overlook it if I am freed, and can resume my work."

Bruno taps the iPad. "Still waiting, I'm afraid."

"There's nothing to be done?"

"Something will happen when the agent returns with her supervisor." He almost convinces himself.

"You are not well," Ruteb says suddenly.

"At least I'm free to walk through the door."

"What is killing you?"

Bruno has no intention of giving this client a tour of his private house of horrors. But, lacking other options, he offers the lowlights.

Forgetting the shackles and the bruises, Ruteb leans forward eagerly. "Mr. Bruno, the whole purpose of my research is to guide people in your situation!"

Bruno is getting angry now. "Do you want to get out of here or not?"

But Ruteb will not give up. "There are different kinds of death. There is ... preservation of energy and form, but there is also annihilation."

"I don't understand." Nor does he like any mention of *annihilation*.

Ruteb strains at his bonds. "Your soul has a physical presence. It exists in the universe, so it can be affected by physical forces. It can persist, it can evolve ... and it can also be annihilated, obliterated. It can cease to exist."

Now Ruteb takes a breath, as if the next statement costs him. "My brother's soul was annihilated when he blew himself up. He vanished from the universe as if he had never been born. This is the fate of those who engage in terrorism."

"Oh, now political acts affect the afterlife?"

"Only political acts that result in the annihilation of the self. The 9/11 bombers, for example—but also many of their victims."

Bruno appreciates the grim irony of terrorists paying the ultimate price for their acts—vanishing from the universe. But hearing that their victims meet the same fate? Could the universe—cold and uncaring, yes—be so totally fucking unfair?

Given his current condition, he might actually consider this hideous argument. "So ... those who were at Hiroshima."

“Annihilated.”

“Firebombed in Tokyo and Dresden?”

“The same. If your body is vaporized, so is your soul.”

Bruno sits up straight. He recalls a phrase from the Civil War—a *good death*. Yes, some Confederate general, maybe Jackson or Stuart, mortally wounded and making his peace, passing into the Great Beyond to rest in the bosom of the Lord.

No annihilation there.

“What about dying of old age? Getting killed in a car accident?” He doesn’t feel the need to ask about dying of cancer at age thirty-three.

“It depends on your physical and mental state. A person who dies of old age while suffering from dementia is in the same state in post-life. Someone who dies from injuries that don’t annihilate the corpus will make a better transition.” Ruteb shakes his head. “This is very complicated. But it is known, for sure, that there are ... hierarchies. Not all deaths are equal.”

A phrase that has been floating, unfocused, in Bruno’s mind, suddenly sharpens. “You’re saying there is no death neutrality.”

Ruteb nods.

“This is ... horrifying.”

“I have not slept well since learning this.”

“Bet you’ve been careful about what you do, too.”

Ruteb looks glum. “I refused to get on an airplane until I realized that I faced annihilation if I remained in Jordan.”

“If this is true, it would change the way everyone lives.”

“Or dies.”

Both hear a thump, followed by a second and a third.

“They told me it was an exercise,” Bruno says. He glances at his iPad, which has cached a news bulletin, and now sees mention of a lockdown at LAX.

Bruno stands and knocks on the door. “Tania? Anyone?”

He feels a concussion through the door.

Ruteb feels it, too. “Please get me out of here.”

“I can’t undo those shackles. Believe me, I’ve tried.”

He is paralyzed, useless. His client is trapped; so is he while God only knows what madness is taking place a few yards away.

He tugs at the table. “What good will that do?” Ruteb says.

“I want to move it away from the door.” But the table is bolted down. Bruno’s only defensive option is to reposition his chair directly behind the door, turning himself into a human shield—a phrase suddenly filled with new and disturbing meaning.

“Move back here,” Ruteb says. “If there is a bomb, you might die, but you will escape annihilation.”

Bruno leaves the chair wedged under the knob, blocking the door, then crouches down next to Ruteb. Nothing more on his iPad. His phone shows one bar, however, and he dials Chang.

And gets her voicemail.

“What about ghosts?” he says, surprising himself.

Even Ruteb is startled by the change of subject. “Ghosts are a type of morphogenetic field, we think. They are souls whose deaths were not violent enough to result in annihilation, but which carried some residual physical charge. Possibly emotional.”

“Unfinished business in life?”

“As good a description as any.”

All of this troubles Bruno, not for the outrageous subject and its horrifying implications, but because it detracts from his mission. Doing his job is what he was known for, even as a dutiful son covering for an alcoholic father and an unhappy mother. In college, in law school, he was always the note-taker, the test-giver.

At the firm, he has been the one to push for pro bono work for immigrants, even as he deals with his own health problems.

His phone rings—Chang, shouting over exterior noise. “Are you safe?”

“We’re still locked up. Where are you?”

“Off-site. Someone in Bradley Terminal jumped several agents and took their guns.” She paused, apparently listening to someone else. Back to Bruno: “That’s what they’re telling us, anyway. It could be an actual attack —”

Bruno is shocked to hear what has to be gunshots from one or more automatic weapons.

“Fuck,” Chang says. Bruno knows that his former lover never uses profanity unless terrified. “Listen to me,” she says, and even with the sad acoustics of his cell phone Bruno can hear how frightened she is. “We got some info on your man Ruteb. He apparently worked at some freaky-deaky place in Syria where they tortured people.”

“What kind of place? What did they do?” Bruno can’t help looking at Ruteb as he hears this.

“Ask him! Gotta go!”

The phone dies.

Ruteb’s head hangs. He surely saw Bruno’s face, and might have heard Chang’s words. “Torture?”

Ruteb’s whole posture screams denial. “Not me. Not my team. Years ago, yes, when our institute worked with the Soviet group. Their methods were extreme.”

He shifts now, and pleads. “We did monitor and observe many human subjects who were on the verge of death, and then died. But they volunteered!”

*Fine, fine*, Bruno thinks. But he wonders if Chang is right. And maybe this Vindahl person and the Lumina facility are bogus.

Even as he formulates this theory, he judges it stupid, too convoluted, too unnecessary. He is on his way to an alternate view when there is knocking on the door. “Bruno!” he hears. Tania Wilson’s voice. He opens it to find her wearing body armor. “We’re getting out of here,” she announces, stepping over to Ruteb and unshackling him. “Do you have his papers in order? Bruno!”

Bruno has lost focus. His lack of energy again. He locates them. “Yes. Why?”

“We’re leaving the airport.”

“Is there some kind of attack? We heard explosions and a lot of gunfire.”

“I only know what I know and that ain’t much. Come on.”

★ ★ ★

Down the hall they go, Bruno in front, Ruteb behind him, Wilson in the rear, reversing Bruno’s route of four hours earlier. The other rooms seem deserted. In fact, the facility feels like an office building on a Sunday morning—which, Bruno realized, it is.

Bruno stops at the door leading out into the main concourse. “What’s the holdup?” Wilson says.

“Voices.”

Wilson slides forward and, as quietly as possible, opens the door enough so she can see.

She waits.

Ruteb says, "Why don't we stay here? It seems safer."

"Come on," Wilson says. "Once you're out that door, you've immigrated."

Ruteb looks to Bruno. "Technically. But you will still be liable for detention, even prosecution—"

"Shut up, Bruno," Wilson says, opening the door all the way. "Take yes for an answer."

Bruno nods to Ruteb, too. *Go.*

★ ★ ★

The main concourse, with its ticketing and food court, is deserted, but scattered bags and other debris scream of a frantic flight. Bruno sees a pair of TSA agents in armor waving them to theoretical safety.

Crouching, Bruno runs. He feels as though he is back in Boy Scouts.

It only takes seconds to reach the TSA team. One of the escorts, a heavysset armed agent nameplated ESPARZA, points to Ruteb, saying, "Who is this?"

Wilson says, "None of your business," which surprises Bruno.

And with no further conversation, they all run out the front doors of Bradley Terminal.

Bruno blinks in the bright midday LA sunshine. Nothing seems to be wrong ... except that there is no traffic, no honking, only the overhead *whap* of helicopter rotor blades.

And not another human being in sight. "Where'd everybody go?" Bruno says.

Esparza's partner, Nolan, grunts, more or less. "If they're following directions they're miles away by now."

But Wilson is also amazed at the lack of people. "We simmed big evacuations but we never got anywhere near this empty."

"We've had an hour," Esparza said.

"We had a *day*."

"We must have learned something."

Bruno, Ruteb, and their escorts continue to move across the street, then into the relative shelter of the parking structure.

"Are we good here?" Wilson says. Bruno takes this to mean safe.

As does Esparza. "Better, still not great" he says. He is busy with a cell

phone and earpiece.

There is a burbling from inside Bruno's briefcase. His phone. "Sorry," he hisses, pulling it out of his pocket and raising it to his ear.

"Is this Mr. Bruno?" It is difficult to hear outside, but is clearly the voice of a woman.

"Yes—"

"This is Hannah Vindahl. Your message said you're trying to get Ahmed Ruteb out of immigration hell."

"I do have him. We're in a different kind of hell right now. Can't really talk."

Esparza and his unnamed colleague are staring at him. Even Wilson is shaking her head.

Ruteb, however, is eagerly gesturing toward Bruno, the phone, himself.

"I'm watching the news now," Vindahl says. "You need to know ... they're probably trying to kill Ruteb. I ... I'm on my way."

Bruno wants to ask for more details, but the call ends as a flurry of gunshots crackles nearby, sending all of them crouching.

When it is quiet again, Bruno more or less whispers, "This is about *him*?"

Wilson looks at Bruno.. "Yes."

He understands. Assuming the truth of Ruteb's theories, believers of all faiths would brand him a dangerous heretic. "So we've got to get out of here."

"About fucking time you realized it," Esparza says. He has been popping over the barrier to scan the surroundings. "We should try the other side," he says.

No one argues. All five of them start crab-walking, keeping the low wall of the parking structure between them and whoever out there is shooting.

Twenty yards deeper, they have rows of parked cars as shields and are able to move faster, though still carefully.

"Why didn't you tell me they were after my client?" Bruno says to Wilson.

"Didn't know until half an hour ago, and came to get you immediately."

"Who is it?"

"Some outside group, maybe four or five people. We got one of them

and he had your man's photo and flight information."

"Okay."

"I'm really looking forward to knowing why."

"You might not like it," Bruno says.

They have reached the east end of the parking structure and another elevated roadway. Esparza is several feet away, talking quietly but precisely on his cell phone. Bruno hears him asking about *evacuation* and *updates on time*.

Ruteb sinks to his haunches. He looks spent, and who can blame him? "You're almost out of here," Bruno says. "Am I a hotshot lawyer or what?"

The attempt at lightness fails. Ruteb says, "This has been my life for four years."

"We're changing your life," Bruno says, with optimism he doesn't truly believe, especially given his own condition.

Then he hears Esparza saying, "Okay, okay, I guess we have to." Esparza removes his earpiece, then taps quickly at his cell phone as he turns to Bruno and the others. "Here's the deal. There are two trucks filled with high explosives, one that way about a hundred yards, the other on that side, maybe one fifty."

"How did they manage to get past security?" Bruno says.

"I don't fucking know. But whoever got them past, however they did, is talking to us." He aims his phone at Ruteb. "They want him or they blow the place."

"We can't—" Bruno and Wilson speak as one.

Esparza waves his phone. "We aren't turning him over. But the big problem is they've put a clock on this." He glances at his phone. "Ten minutes."

"How bad is it?" Wilson asks.

"If both trucks are filled with C-4 or anything like it, they will collapse this structure, three terminals, and leave a crater the size of a football field."

"God, there are a couple of thousand people in every terminal."

"We've been getting them out," Esparza says, "but yeah, we could be looking at casualties on the order of 9/11."

"Annihilation," Ruteb says, his voice quavering.

Bruno is the only one who knows exactly what he means.

“What do we do?” Bruno says. “Doesn’t sound as though we can hide.”

“Nope,” Esparza says. “We move. The bomb squads are dealing with the two trucks. If we can get to the upper level near Terminal Five there will be a chopper.”

“When?” Wilson asks, as Bruno sees the sheer terror in Ruteb’s eyes. Or maybe it’s just a reflection.

“Now!” Esparza says.

He and Nolan take up flanking positions to either side of Ruteb, Wilson, and Bruno. A nod, and they all hustle out of the structure into the empty street.

“How much time?” Wilson says, panting. Exactly what Bruno wants to know.

“Call it eight minutes and don’t ask again,” Esparza says.

They have covered no more than thirty yards and are two levels below a landing pad when Bruno realizes that something is wrong—the others sense the same danger. To their left, Bruno sees what appears to be an abandoned Ryder van.

The back is opening and a man is emerging with a weapon, raising it to shoot.

The spray of bullets sends all of them sprawling, through Ruteb is last to hit the pavement.

To Bruno, Ruteb is strangely ready to accept his fate—anything but annihilation.

The countdown must be at five minutes, less, and they can’t move!

Then Esparza and his partner and Wilson are blasting away at the shooter. Bullets ping, punching holes in the van, kicking up pieces of pavement.

Four minutes—

The shooter is still upright.

Wilson is hit. She spins to the ground, dropping her pistol.

Bruno rushes to her, sees the fear on her face as he says, stupidly, “I’m here. You’re good.” Because she appears to have been shot in the thigh, not in her torso.

But none of them are good—

Three minutes.

Then Ruteb stands up, as if daring the shooter to get him.



The shooter falls.

“Two minutes!” Esparza says, and now he sounds shaken. “Come on!”

Ruteb picks up Wilson’s pistol. “We will not escape,” he says to Bruno. “You should all—”

And he shoots himself in the head, blood spurting from one temple.

He crumples as Esparza, his partner, Wilson, and Bruno can only stare.

One minute.

Bruno looks at the pistol in Ruteb’s hand. Is about to reach for it when Wilson groans.

He reaches for her instead. He and Esparza haul her up and head out, the partner providing cover.

The timer on Esparza’s phone buzzes.

Zero.

Bruno waits for the flash of light and heat that will send him into the worst kind of death.

And waits.

“What the fuck?” Esparza says.

“Maybe the bomb squad got them.”

“Keep going.”

And they do, reaching the chopper without getting shot at, or annihilated.

★ ★ ★

They leave Nolan behind—no room in the chopper— and are airlifted to Marina del Rey, three miles south. Bruno spends the entire fifteen-minute trip in a crouch, his face against the rattling frame of the chopper as an EMT and Esparza stabilize Wilson—he hopes.

Bruno wonders if he should use his phone to send a message to his mother and friends, listing himself as *safe during LAX emergency*.

Idiot. He’s *not* safe.

Then, over the insane shuddering of the helicopter, he sees the EMT leaning over Wilson, applying chest compression. Esparza can only look helplessly at Bruno.

And Bruno wants to nudge the EMT aside and tell Wilson, *Let go! Die here and now before some explosion annihilates us in midair—!*

But then Wilson moans and the EMT sits back. “Okay for now,” he says.

The chopper is already dropping toward the pad at the hospital.

Within two minutes, Bruno is seeing Wilson transferred to a stretcher, gratified that she is conscious. She even squeezes his hand as she is lifted.

Esparza helps Bruno out of the chopper and toward the emergency room, not lifting him but definitely urging him forward. "It could still go off," he says. Which Bruno knows and fears.

Chang is waiting as Bruno enters the emergency room, which is filled with LAX passengers and staffers somehow injured in the evacuation. Before he can sit, or collapse, she catches him and helps him to a chair.

"Jeff, you need a doctor."

"I'm fine. I mean, relatively speaking. Alive for now."

Chang's phone rings. "Sorry, let me—" She will answer it no matter what he says. He nods as she walks away, already complaining, "They won't let any of us leave and we're inside the blast zone—"

She does not ask about Ruteb.

Bruno has a moment to feel his own hunger, thirst, weakness. And then to appreciate his situation: threatened by near-term death, possible annihilation.

He looks at those arrayed on plastic chairs on either side of him, people of color in many cases, children with adults, no one truly old. Staffers wearing badges, sneakers, and blue garments glide or sprint from one machine or patient to another. Doors and curtains open and close.

The televisions are off.

Esparza stands at reception talking into his phone.

Who here is facing *a good death*?

"Are you Jeff Bruno?"

Bruno turns. A large, red-haired woman of middle years with a bandage on her forehead is sitting behind him. "Hannah Vindahl," she says.

"How the hell did you get here?"

She pats the bandage on her head. "I ran into an ambulance while using my phone. Where's Ruteb?"

Bruno can't soften the message. "Dead."

Vindahl actually puts her hand to her mouth, a shock response Bruno has never seen. "But he was with you!" Bruno senses the tiniest hint of criticism in her voice. "What happened?"

He points a finger at his temple and mock pulls the trigger.

“Oh, God, they *shot* him?”

“Shot himself.”

Bruno can see Vindahl absorbing, then processing this terrible news.

“Well, fuck.”

“I guess he believed.”

“So do I.” Her expression softens. “And so, I think, do you.”

It’s Bruno’s turn to process a statement, which hits him as hard and deeply as his cancer diagnosis did. “Where,” he finally says, “does that leave us?”

“Pressing on with our work. Thank God Ruteb transferred most of his data.”

“With religious assassins everywhere we look?”

“This team was probably from Ruteb’s institute. They think he’s a traitor for sharing their research. Now that he’s gone, they’ll think they’ve won, for a while.”

And she takes Bruno’s hand. “Join us.”

The offer is as startling as it is kind. Bruno knows he is done with law, with Gloria Chang. But as he stares into the days, months, and hopefully years to come, he wonders ... *How do you live when even death is unfair?*



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# ZEITGEBER

GREG EGAN

# Zeitgeber

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**G R E G   E G A N**

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# 1

“Daddy?” Emma pleaded. “Why aren’t you awake?”

Sam opened his eyes and squinted toward the sound of her voice in the darkness, ready to offer whatever comfort she needed, but as he replayed the words that had penetrated his sleep she sounded not so much frightened or unwell as annoyed and censorious. “What’s wrong, sweetheart?” he asked. “Did you have a nightmare?”

“No!” Her tone was pure frustration now, as if the thing most troubling her was his obtuseness. She reached over and tugged his arm. “Why won’t you get up?”

Laura shifted beside him; Sam waited, afraid they’d woken her, but then he heard the rhythm of her breathing and he knew she was still asleep.

“Shh,” he whispered to his daughter. “Why don’t I get you a drink of water?”

He slipped out of bed and took her hand, then led her from the room and closed the door behind them before switching on the light in the passageway.

In the kitchen, he filled a cup from the sink and handed it to her. She gulped the water down eagerly, but when he took the cup back she said, “I want oats, please.”

“You can have oats for breakfast,” Sam replied. “It’s the middle of the night.”

Emma laughed. “No! It’s breakfast time.”

Sam gestured at the digital clock on the microwave. “What does that say?”

She frowned and moved her lips for a moment before announcing, correctly, “Twelve fifteen.”

“And what does that mean?”

Emma shrugged. “The power went off?”

Sam resisted the urge to congratulate her on her lateral thinking. “Sweetheart, it’s nighttime. You need to go back to bed or you’ll be too tired to get up in the morning.” He took her hand again. “Come on, I’ll tuck you in.”

“No!” She pulled free. “I want breakfast!”

Sam squatted beside her. “What’s going on? If you had a nightmare, you can tell me. You know that.”

Emma scowled impatiently, brushing off his attempt to change the subject. “Why can’t we have breakfast?”

Sam walked to the back door and opened it. “Look! It’s pitch black outside!”

All he could see was the light from the kitchen spilling onto the dewy lawn; beyond that, the yard was lost in darkness. "Does it look like the sun's coming up soon?"

Emma didn't answer. Sam closed the door, afraid that he'd already risked giving her a cold. He reached down and scooped her up into his arms, rubbing her shoulders to warm her, and carried her to her room.

As he pulled the blankets up to her chin, she started, not so much crying, as emitting blubbery sounds of protest.

"That's enough!" Sam said. "If something's scaring you, tell me what it is and we'll make it go away." He waited, but Emma didn't take up the offer. "Okay. So close your eyes and dream about breakfast, and before you know it, it really will be morning."

Back in his room, as he lay down beside Laura, he heard Emma leaving her bed again. He waited, hoping she was just fetching one of her stuffed animals to cuddle beside her. But after a few minutes, he still hadn't heard a second telltale squeak from the bedsprings.

He rose and walked down the passageway to her room, then stood outside the door, listening, not wanting to disturb her if he'd simply missed the sound of her settling back in under the covers. But then he heard her harrumphing to herself.

He opened the door. She was sitting on the floor in a patch of light coming through the window from a nearby streetlamp, fully dressed in her school clothes. She had a pad of paper in front of her, and she was drawing on it with her colored pencils.

"What do you think you're doing?" Sam demanded.

She held up the paper to the light from the window. She'd drawn a yellow disk surrounded by radiating lines, with birds flying across the sky beside it.

"You didn't believe me," she replied accusingly. "So now I have to show you."



## 2

“Are you sure you’re in control of her screen time?” Dr. Davis asked. “Sometimes parents don’t really know what’s going on.”

Laura said, “She has no devices of her own—no phone, no tablet, no TV in her room. Before this started, she’d watch TV for a couple of hours before dinner.”

“And she’d fall asleep after twenty minutes listening to one of us reading,” Sam added. “It was a pretty steady routine: in bed by seven thirty, eyes shut by eight.” He turned to glance at Emma, lying on the pediatrician’s couch, dead to the world at two p.m.—the earliest appointment they’d been able to get. But from midnight to noon, she’d had as much energy as any healthy six-year-old ... just seven hours earlier than usual.

“The MRI and the blood tests rule out any kind of tumor,” Dr. Davis stressed. “And with no family history of sleep phase disorders, at this point the simplest explanation might be that she’s responding to something in her life that’s troubling her.”

Laura frowned. “Nothing’s changed for her recently. She settled into school with no problems—and she’s never been reluctant to go in the morning. Even now, the hard part’s making her wait. And when she started dozing off in the afternoons, she was mortified.”

“I’m not suggesting that she’s feigning sleepiness to get out of school,” Dr. Davis replied. “But if something’s persistently waking her at night—either some anxiety she’s feeling, or some external factor—that could be enough to disrupt her whole routine.”

Sam said, “She’s adamant she’s not having nightmares. And it’s a pretty quiet street. I’m a light sleeper myself; if the neighbors’ dog was barking, or the fridge motor was making a noise, I’d be the first to know.”

Dr. Davis scribbled something in his notes. Then he said, “I can recommend a psychologist, but the waiting list is brutal right now; you’d probably be looking at six or seven months. In the meantime, I’ll order genetic tests for all the familial sleep disorders, just in case there’s something we’re not seeing in the history, but I think that’s a long shot.”

“So what should we be doing,” Laura asked, “while we wait for all that?”

“Try to guide her back toward her old habits. Try to keep her awake a little later in the afternoons, so she’ll sleep through a little later as well. A few nudges like that, and it’s possible the whole thing will resolve itself.”

On the drive home, Laura sat in the back with an arm around Emma. Sam wasn’t sure what he’d do if he had to drive her somewhere by himself; she was far too big for her old baby seat, but the seatbelt alone couldn’t keep her from slumping.

“Do you think I should take a couple of weeks off?” he asked Laura. The substitute teacher who’d come in to cover his classes for the afternoon was always keen to do more hours.

“No, I can keep working from home,” she replied. “The firm doesn’t mind, and half our meetings are by Skype anyway.”

“What about site visits?” Sam knew she didn’t need to show up for every concrete pour, but she liked to keep a close eye on the details of every building.

“There’s nothing coming up for a while.”

As Sam carried Emma from the car, she stirred slightly, grimacing, but her eyes remained shut. “Look at that sleepy head!” Mrs. Munro called out from across the road. “Someone’s been up past their bedtime!” Laura raised a hand to her in greeting, muttering insults under her breath.

Inside, Sam got Emma into bed, then he knelt beside her and buried his face in his hands. He could feel himself trembling with relief. It wasn’t a brain tumor or a neurological disease. Most likely, it wasn’t anything dangerous at all.

Her sleep was out of phase, but it was a phase she could grow out of. All they had to do was gently pull her back into synch with the rest of the world.

### 3

“Big night on the town, sir?” someone called out.

Sam’s eyes snapped open, and half the class burst into laughter. “Very funny,” he said. “But you’ve only got ten minutes left, so you should probably save the jokes until then.”

He punched the side of his leg under the desk and stared at the clock at the back of the room, wondering if the collective will of the students, desperate for more time to finish the test, could actually freeze the minute hand in place. He and Laura had got through months of broken sleep when Emma was teething—but back then, after their interventions, she’d usually drifted off for a while. Now, once she was up, she stayed up, and even if she did her best to be helpful and pass the time quietly on her own, Sam felt too guilty to let her sit alone in her room, drawing, for hours on end. He wasn’t sure anymore where the line lay between unforgivable neglect and prolonging her wakefulness by making it more tolerable, but he couldn’t sleep through the night as if nothing was wrong while his daughter was going stir-crazy.

After the siren rang and he’d gathered up the tests, he detoured to the staff room. He’d graduated to four spoonfuls of instant coffee and three of sugar; he usually drank it black, but now he added just enough milk so he could gulp it down quickly without burning his mouth. The brown sludge made his teeth ache and his stomach clench, but it cranked up the volume on the white noise buzzing behind his eyes, summoning fragmentary thoughts from the static to ricochet around his skull. However remote this state was from normal consciousness, the sheer rate of random mental activity ought to be enough to keep him from dozing off.

As he walked across the carpark, acid rose into his throat. He could feel his blood pumping, but it was not so much a rush of vigor as a sensation akin to the aftermath of hitting himself with a hammer. This wasn’t going to work; even if he’d managed to immunize himself against micro-sleeps for the next twenty minutes, he had no more faith in his judgment and reflexes than if he’d just drained a bottle of whiskey.

He looked around. “Sadiq?”

Sadiq paused, stooped at his open car door with an armful of paperwork.

“Any chance I could get a lift with you?”

“Sure.”

Sam approached, hoping his gait didn’t appear quite as unsteady as it felt. “Thank you.”

“Car trouble?”

“No. I was up half the night with Emma, and if I drive...”

Sadiq nodded. “No problem.”

As Sam buckled in beside him, Sadiq asked, “So Emma’s been sick?”

“Yeah.” Sam hesitated; Sadiq’s son had muscular dystrophy, which seemed to demand a recalibration of his own difficulties. “Something’s messing with her body clock. She wakes up in the middle of the night, and then she’s completely alert for the next twelve hours.”

Sadiq was silent as he drove through the carpark; Sam assumed he was trying to frame a polite response to such a trivial complaint. But as they turned onto the road he said, “I know how annoying it can be when people tell you they know someone with the same medical problems. Ninety percent of the time they have no idea what they’re talking about.”

“Okay.”

Sadiq grinned. “So take that as given, and feel free to ignore this. But my brother-in-law has the same symptoms.”

“Yeah? What did they diagnose?”

“Oh, he won’t see a doctor. He insists it’s not just insomnia, but he’s too much of a tough guy to admit that he might not be able to get back to normal by sheer force of willpower. It’s driving my sister crazy.”

“Hmm.” Sam’s eyelids fluttered closed and he pictured a scowling pugilist, tormented in the small hours by thwarted ambition and a history of concussions. What could a man like that possibly have in common with a six-year-old girl?

Sadiq said, “The thing is—and I *know*, Dr. Google is not our friend—but Noor did some rummaging around on the web, and there seem to be an awful lot of similar cases.”

Sam forced his eyes open. “The last time I looked, all I found were people burbling about their digital detoxes and their valerian enemas.”

“Yeah, and maybe this is nonsense too. But I’ll get her to send you a link, and you can make up your own mind what it’s worth.”

When Sadiq dropped him off, Sam opened the front door as quietly as he could, and made his way to the spare room where Laura had set up their shared home office.

“How was she?” he asked.

“When I picked her up at lunchtime,” Laura replied, “she said she wasn’t tired and she begged me to let her stay. And then she didn’t fall asleep until almost two o’clock.”

“That’s progress, isn’t it?” Sam hadn’t been keeping records of the time she

woke; he'd been trying to leave her on her own until two a.m. or so, when she'd already been up for a while. But it did look as if the whole cycle was moving forward by about five minutes a day.

Laura seemed unwilling to raise her hopes too high. "What happened to the car?" she asked.

"I didn't want to drive. I'm kind of wasted."

"Okay. Why don't you grab some sleep right now?"

"It's my turn to cook dinner."

"Forget it. I'll order takeaway."

Sam managed to stay awake just long enough to get undressed and crawl beneath the sheets. Three hours later, he was roused by the scent of fried rice. His caffeine binge hadn't kept him from sleeping, but it had thrown enough grit into the clockwork that he emerged from the process out of synch with himself: ravenous as if it were morning, chilled to the bone as if it were three a.m., and afflicted with the kind of headache and parched mouth that brought back distant memories of nights spent clubbing, when he'd staggered home at dawn and woken at noon.

When he walked into the kitchen, Laura was taking the lids off the food containers, sending aromatic vapors wafting up from the table. Sam listened for any sound from Emma's room, but there was nothing. "She loves Chinese food," he said. "I don't know how she can sleep through this."

As he ate, he began to feel better. It was seven o'clock now; if Emma hadn't slept until two, she might not wake until one, so maybe he could sleep again from ten until ... three? Leaving her on her own for a couple of hours wasn't torture, and if he didn't start setting limits he'd end up either dead in a ditch or sacked for incompetence.

"How was work today?" he asked Laura.

"All right."

"It's not getting you down? Being stuck here?"

She frowned, thinking it over. "I probably get more work done in a day, even spending a couple of hours with Emma. It's a bit numbing when I'm alone, though. Some of my colleagues are pretty annoying, but sitting at a desk in a silent house ... when you're focused, it's fine, but when you stop and look around, it feels like you're the last person on Earth."

When Sam had cleared the table, he glanced at his phone. Sadiq's sister, Noor, had emailed him a link.

Laura was in the living room, browsing the menus of the streaming services in search of something that would help her unwind. Sam walked down to the office and opened the link on the desktop.

Noor had found a long thread on a medical support group forum. Sam was generally skeptical of such venues, but at least this one was well-organized. The thread in question was dedicated to sleep-phase disorders where the sufferer had no

family history or genetic markers, no psychiatric illness, no shift work or frequent long-distance travel, and no apparent brain injuries, tumors or lesions.

Despite this niche-like specificity, there were tens of thousands of individual posts. A moderator had helpfully pinned one entry to the top of the list, giving an overview of the results from a survey of the thread's participants, to which more than three thousand people had responded. The sufferers seemed to lack any particular concentration by age, sex, occupation, ethnicity, or geography, compared to the demographics of the forum as a whole. People's "phase at onset" spanned the full gamut, from twelve hours' advanced to twelve hours' delayed—but however things had started, nobody's phase remained unchanged relative to clock time. It usually slipped forward by a few minutes a day, but for a fraction of the group it went in the other direction. And as the moderator noted, this scatter was more or less in line with the range of endogenous circadian rhythms reported by sleep researchers for healthy volunteers who'd been deprived of sunlight and social cues, leaving their body as the only time-keeper.

Sam scrolled down a little further and skimmed the highest-rated posts, expecting to find testimonials to some suitably fashionable cure. But if there was snake oil on offer here, it had been down-voted out of sight; the majority opinion was that nothing worked. People had tried everything from phototherapy and warm baths to melatonin and modafinil, but their body clocks just kept stubbornly cycling at their natural rhythm, close to but not exactly twenty-four hours, oblivious to every natural or pharmacological "zeitgeber" that might have been expected to jolt them back into synch.

A sidebar offered links to academic sources on sleep disorders. Sam followed the one on "free-running sleep" to a review article in a medical journal. The vast majority of cases where people's body clocks ceased to be entrained by the outside world involved total blindness, where the patient had lost, not just vision itself, but the retinal ganglion cells that were sensitive to ambient brightness. Sighted people with the disorder were supposedly rare, and often had tumors, head injuries, or other detectable causes of damage to the suprachiasmatic nucleus that orchestrated the circadian rhythm. In one study, they'd also been found to have significantly longer cycles than normal—unlike the people on the forum.

He heard Laura approaching. "What are you looking at?" she asked.

Sam described what he'd read so far, trying to downplay the pessimistic conclusion. "I'm sure there's a selection effect here," he said. "Anyone with a problem that went away quickly probably wouldn't post on a site like this."

But Laura seemed intent on preparing for the worst. "If Emma's a free-running sleeper now, how often will she fit in with a normal school day? To really be able to concentrate, she'd have to be awake by seven, but not up so early that she's falling asleep before five. That's a three-hour window to wake in, between four a.m. and seven a.m.—one-eighth of the clock. So for a five-week block in every forty she'll be fine, but for the rest..."

Sam said, “If it really does come to that, I could always home-school her. But it’s only been a fortnight! Maybe she’ll just keep waking later and later until she gets back to normal—and then she’ll be so happy that she’ll slam on the brakes, and that will be the end of it.”

## 4

Sam arrived for the first class of the new term feeling sharp-witted and thoroughly prepared. The day had started as well as he could have hoped: he'd woken at five, found Emma still asleep, then spent the hour until she rose reviewing his lesson plans. But each time he turned away from the blackboard to gauge how well his line of exposition was getting through, his gaze was drawn to the empty chairs in front of him, and he lost his thread completely.

A third of the class was missing. A cynical part of him was tempted to attribute this to copycat malingerers, but that couldn't be the whole story: two of his most enthusiastic students had failed to show up. When he asked a question, he still found himself reflexively preparing to deflect their responses to give someone else a chance to answer, and the silence that greeted him instead was unsettling. No one had died, or was even ill in any normal sense, but the thinning numbers still felt like the sign of some terrible loss.

At lunchtime, the staffroom was less starkly depleted, but everyone in sight looked anxious. Sam joined one dispirited group.

"We need to start doing something more," he said. "Sending students worksheets and hoping they'll pick up what they miss from YouTube lectures at three in the morning isn't going to cut it."

"So are you volunteering to come in at three a.m.?" Gloria asked. "And if you are, who's going to teach your regular classes?"

Sam said, "The overall numbers aren't changing; there are exactly as many teachers per student across the district as before. We just need to reorganize things, matching up students and teachers by phase. I'm not free-running myself, but I'd be happiest following my daughter's phase. If she could go to school when it suited her, I could work those hours, teaching any students in the area who were on the same schedule. My old classes would have to be merged with those from the closest two or three other schools—"

Sadiq cut him off. "That's not going to work. The logistics for keeping the buildings open twenty-four hours a day would be unmanageable, let alone shuttling kids across three suburbs in the middle of the night. If students can't make it in normal hours, we need to be flexible, but not like that. We need to use software,



video lectures, whatever it takes to keep them up to speed. But they'll have to do it from home."

Tom regarded them both as if they'd lost their minds. "Whatever's causing this," he said, "it's not going to last forever. In a couple of months, we'll be back to normal."

"You think it's going to burn itself out, like a bad flu season?" Sam replied. "The way it's spreading doesn't look like an infection. Nor does the biology: there's no inflammation, no antibodies."

Tom snickered. "Yeah, well, if ninety percent of it's 'viral' in a different sense, what would you expect?"

"Hardly *ninety percent*," Sam retorted. "And even if you think that many kids don't want to be here, most adults have nothing to gain by faking it; they don't have enough paid sick leave or income protection insurance that they can lie in bed all day—and all it would take to prove that they're frauds is one polysomnogram."

Tom was unrepentant. "People manage to do shift work all the time. If a nurse can turn up for a graveyard shift, no one has any excuse not to show up when they're needed."

Sam was growing angry now. "Some people adapt better to shift work than others—but if they do, it's because their circadian clock is responding to all the timing cues: they're out of bed, moving around, eating, exposed to bright light. The whole problem for free-runners is that none of those cues affect them! It's no different from being blind to sunlight—except you're also blind to temperature, food, exercise, social interaction, and every jet lag pill ever invented."

Tom didn't reply, but he adopted the pained expression of a martyr badgered into silence. He knew the truth: anyone with a spine would grit their teeth and rise from their bed to meet their obligations.

When Sam picked up Emma, he watched the elaborate ritual of her parting from her best friend, Natalie. After the hug that was meant to finalize things and let them go their separate ways, they turned back to each other no less than five times, with afterthoughts and reminders.

"How was school?" he asked, as she approached.

She shrugged. Sam didn't press her; he had no need to quiz her to see that she was perfectly alert. When she'd first resumed normal attendance, she'd spent half an hour telling him how happy it made her, but by now she was probably just taking it for granted. He hadn't had the heart to warn her that the situation might not last.

"Olivia fell asleep before lunch," Emma said, as Sam unlocked the car. "And Mitchell fell asleep after lunch. And Karen didn't come until after recess because she didn't wake up until then."

Sam said, "Yeah, a lot of people are having the same problem as..." He cut himself off, unwilling to commit to any particular tense. As you *had*? As you *have*?

"But how will everyone stay friends if they can't see each other?" Emma

demanded indignantly, as if this whole state of affairs had been decreed by someone who just needed to be told what a terrible idea it was.

“People stay friends when their friends get sick,” Sam replied. “Or when they go and live somewhere else. You don’t have to see someone every day to be their friend.”

“No,” Emma agreed reluctantly. She adjusted her seatbelt. “But I want to.”

Sam pulled the door shut beside him. He said, “Do you want to stay friends with Natalie?”

“Yes.”

“Then you’ll stay friends with Natalie. Even if it’s hard, even if it’s complicated, you’ll find a way to do it.”

When they arrived home, Laura’s car was in the driveway. Emma ran inside, calling out to her mother; Sam had thought she was going to be on site all day, but maybe there’d been a change in the schedule.

He found her in the bedroom, sitting on the edge of the bed, staring at the wall. Emma had stopped in the doorway, confused.

“What’s wrong?” Sam asked.

“There was an accident,” Laura said.

He turned to Emma. “Can you go and put your books away?”

Emma nodded uneasily and retreated.

Laura said, “One of the operators swung a crane into the scaffolding. Three people are dead, and five are in hospital.”

Sam bowed his head. It sounded like something that should have been impossible. “So was it equipment failure?”

“No,” she replied. “We’ve got video from inside the cab. The operator just kept his hand on the lever.”

“Why? Was he having a heart attack?”

“No. He closed his eyes and fell asleep.”

## 5

Halfway through the lesson on Al-Karaji's triangle, two new students entered the room quietly, hung their dripping umbrellas over the bucket, and took seats at the back. Sam paused to greet them, then resumed, glad he'd managed to iron out the sound problems that had plagued his last few recordings, so they'd be able to play everything back from the start if they needed to.

The rain came down more heavily, slanted now, striking the window panes on the southern wall with tympanic effect, but he raised his voice and pressed on. "The number of ways you can get  $x$  cubed  $y$  squared in this row is the number of ways we got  $x$  squared  $y$  squared in the row above, six, plus the number of ways we got  $x$  cubed  $y$ , four, for a total of ten. Every time, we're just adding two numbers from above to get the ones below and in between them. So we ought to be able to guess a formula for the numbers in any given row, and then prove it by induction."

Hands shot up, gratifyingly, and Sam wrote each proposal on the blackboard. He glanced at the storm outside, and dared to marvel at the one small upside of the syndrome: not long ago, on a winter's afternoon in a cozy room like this, half the class would have been dozing off, but even at two in the morning these runners seemed impervious to everything that might once have been conducive to a surreptitious nap.

At the end of the lesson, a group of students hung around, hunting for fresh identities between the binomial coefficients while they waited to spend a few minutes with their other-phase friends who were only now arriving. Sam walked down the corridor to the grade three classroom, where Emma was in the middle of a cross-temporal exchange of her own. She stood in a group of a dozen other girls, but it was easy to tell from their states of dampness that about half had just come in from the rain.

He kept his distance, reluctant to do anything to curtail the meeting, but after a couple of minutes the new teacher arrived and ejected everyone whose school day was officially over. Sam fished his phone from his pocket and checked the carpool app; he was scheduled to give three of Emma's friends a ride home. "Sandra? Martin? Chloe?" he called out hopefully. No one responded, but the app showed

him mug shots; he spotted the kids and corralled them toward the car.

As he drove through the rain, Sam concentrated on the road, but it was impossible to ignore his passengers' conversation. "We'll visit you in the hospital," Martin promised Chloe.

"You won't be awake for visiting hours," Chloe replied.

"They should let us come any time!" Sandra protested.

But Chloe was resigned to the impending separation. "I won't be awake when you want to come."

When Sam had dropped off all three, he asked Emma, "What's the time in your head?"

"Ten past three."

He checked his watch. The second row of digits, which he'd programmed to follow her phase, was only two minutes out—and Emma never claimed greater precision than five minutes herself.

"So Chloe's getting the implant?"

"Yes," Emma confirmed. "Her parents aren't rich, but her grandmother's paying."

Sam hesitated. "You know it's not the cost that's stopping us? We could probably get a loan to cover it. I just don't think the safety record's good enough yet."

Emma said, "I don't want it anyway."

"I know. But in a couple of years, when the surgeons have had more practice and the technology's improved..."

Emma sighed, irritated. "I told you, I don't want it. Ever!"

As soon as they pulled into the driveway, Emma flung the door open. Sam watched as she ran to the porch; he could see her umbrella cinched in place in one of the net pockets at the side of her backpack.

He followed her, taking more care to stay dry, and by the time he was inside she'd disappeared into her room. He took his shoes off and trod lightly down the hall to the office. It was just after four, and Laura would be up at six; he could probably get most of his marking done before the three of them were due to have breakfast together.

He switched on the computer and checked his news feed. A story that had broken fifteen minutes ago had rocketed to the top: "Gang 'hacked your sleep,' wants cash for cure." Sam assumed it was a beat-up, but he followed the link anyway. Nothing was going to rival the *Onion's* "Uber Sleep rolls out replacement for Sandman; CEO plays down 'teething problems,'" but intent had long ago ceased to be a prerequisite for satire.

According to the story, a group calling themselves the Time Thieves had claimed responsibility for the free-running syndrome, and were soliciting offers from governments for exclusive access to the cure. The starting price in this auction was a trillion US dollars.

“This is less than one percent of the estimated loss to global GDP to date,” the self-proclaimed biohackers had noted, citing a study by a team of World Bank economists to back up the figure. *Fair enough, then*, Sam thought. The email scammers offering him ancient Chinese herbs to realign his family’s circadian rhythms for sixty dollars a bottle were clearly undercharging.

He was about to close the browser and get to work when he realized he’d skipped a paragraph near the top of the story, distracted by the astronomical sum below. “As evidence for their claims, the Time Thieves have published a digital key that decrypts a coded message describing the condition’s symptoms, which was posted on social media accounts six months before the first cases were reported.” Sam was skeptical; would it be that hard to hack a Twitter or Facebook post so it seemed to predate the outbreak? But then he searched for other coverage of the story that went into more technical details.

The times in question were not just social media metadata. Digital hashes of the message had been sent to half a dozen reputable time-stamping authorities, who’d used their private encryption keys to sign and date what they’d received, allowing anyone to verify that the message really had been signed at the times being claimed. But to counter any suggestion that the top six cybersecurity organizations in the world might have all been hacked—or been willing accomplices to fraud—the Time Thieves had also embedded the same hashes into several globally distributed block chains that offered their own kinds of certification.

Sam read through the full text of the decrypted post. Though its authors spelled out the symptoms of the coming plague clearly enough, they were coy when it came to the biochemistry, sprinkling in just enough jargon to suggest that they knew their target intimately, without revealing anything about the particular spanner they’d thrown into the works. A virus? A toxin? These and other details remained behind a very high paywall.

The current ransom demands had been written in a tone befitting a Sotheby’s catalog, but this screed from (supposedly) two years ago was a boastful, pretentious rant, full of the kind of raw self-aggrandizement only to be expected from someone who believed they’d devised a foolproof means to take the whole world hostage and come out the other end wealthier than a middle-sized nation. There were even some bad puns about the WannaCry computer virus—two of the key proteins in the circadian clock being the cryptochromes, CRY1 and CRY2—as the Time Thieves gloated about their own, stupendously greater feat. Sam couldn’t help being goaded into anger, which in turn swayed him toward belief, though the fact that the document rang true as the heady manifesto of a gang of sociopaths would be by far the least challenging of all the forgeries required if the whole thing was actually a hoax.

The response from political leaders so far had been cautious; everyone who’d spoken had condemned the extortion attempt, but they’d described any link to the syndrome itself in hypothetical terms, and stressed that law enforcement agencies

were still investigating the claims.

Sam rather hoped that behind this bland facade, someone had already located the perpetrators and dispatched a team of commandoes to liberate the cure with extreme prejudice. Along with the economic damage, there had been at least half a million deaths. His own family had been lucky; as the gears that had linked them to the world had stopped meshing, they'd managed to adapt to the changes without descending into poverty. But all the accidents on the roads, in the air, and at sea, all the fatalities at building sites and factories were no different from the acts of a sniper, and the slow torture as loved ones had been dragged into different phases was as cruel as any forced exile. He'd gladly see the fuckers who'd done this reduced to bloody smears on the walls of their basement lab.

He closed the browser and tried to calm himself. He had work to do, and neither his *Zero Dark Thirty* fantasies nor any other follow-up was likely to be imminent. He believed that these criminals had done what they claimed, but that didn't guarantee that they were in possession of a cure, let alone that anyone on the planet would be willing to pay what they were asking.

## 6

None of Sam's students could focus on the lesson he'd prepared, so he made the best of the situation.

"A hash function takes some data, like a string of text, and gives you a single number that's a whole lot shorter than the original message." He drew a big box full of squiggles, joined by an arrow to a small box full of digits. "The correspondence can't be unique, though; there are billions of messages that have the same hash code. So why doesn't that matter? If someone shows you a message today that gives the hash *X*, along with proof that someone you trust saw that same number, *X*, two years ago ... why should that be enough to persuade you that they actually wrote *the whole message* back then?"

The tactic seemed to work, so he stuck to the same theme for the next few days, but there was only so much cryptography he could teach before it started squeezing out everything else. And then just when he thought he'd exhausted the subject, the Time Thieves dumped a truckload of new material into his lap.

Sam gave in and showed excerpts from the videos. The biohackers had apparently spent months testing their products on macaques, and they were offering up thousands of hours of recordings as evidence that they possessed both the agent behind the syndrome and an effective cure. Every shot contained a bank of screens behind the cages, showing international news channels playing live, along with a certified time-stamped hash of a previous, rolling segment of the video, to prove that the backdrop was not just a recording. But that left only the narrowest of windows between the original broadcast and the time stamps, so if everything involving the animals had been added with CGI, it must have been generated in something close to real time—a feat most experts judged unlikely. If the images were genuine, then according to a team of biologists with the patience to watch much more of the footage than Sam had, they showed that the macaques had entered a free-running state at the start of the experiment, and then abruptly returned to a normal circadian rhythm three months later.

"Maybe they put in brain implants before the experiment started—before the cameras started rolling," Angela suggested.

"Good point," Sam conceded. There was always going to be some potential

loophole; macaques were too long-lived for the experiment to stretch back to their birth, and shorter-lived species like mice were too different in their circadian biology.

Ehsan said, "The technology didn't exist two years ago, did it?"

"Not that we know of," Angela replied.

"Yeah, but how many different things are these geniuses meant to have invented?" Ehsan retorted. "We're talking about implants, *now*, because all the millionaires are getting them ... but I bet it never even crossed these people's minds."

"Forget implants," Nora interjected. "They could have trained these monkeys to wake and sleep for any reason: some sound we can't hear, some smell. They could be pulling all kinds of invisible strings."

Sam let the debate run on, only intervening when necessary to keep it civil. These kids' lives were in the balance; he couldn't tell them to drop the subject and get back to the things they'd be tested on.

On the way home, after he'd dropped off Emma's friends, he asked her if she had any questions about the Time Thieves. He'd done his best to give her a sense of why most people believed their claims, but he wasn't sure if she'd really taken it in. "If there's anything you don't understand, I can try to explain it more clearly."

"I don't care about any of that," she replied. "I just hope no one pays them, because it would be a big waste of money."

Sam kept his eyes on the road. "Why would it be a waste, to get back to normal? Don't you miss seeing more of your mother?"

"She's still around. I still see her. She doesn't have to hold my hand every day."

Sam fought to conceal his dismay. He'd wanted his daughter to adapt, to be resilient. And she wasn't being cold toward Laura; this was just the reality she'd grown to accept, as surely as if the two of them lived on different planets that only came into proximity for brief stretches at a time.

In the street ahead, there were lights showing through the windows of most of the houses. The traffic around them was barely less, at four a.m., than when they'd set out the evening before. And if none of that felt strange to him anymore, how could it feel anything but normal to someone who'd lived the last quarter of their life this way?

"I don't know what will happen with the money," he said. The extortionists had made a trillion dollars sound like a bargain, which had to irk all the biochemists who'd been slaving away trying to understand the syndrome with a fraction of that as their budget. "But my hunch is it won't be long before we can all have the sun on our faces again."

Emma was quiet for a while, and Sam thought she'd let the matter drop. But as they approached the house, she replied, "I already have the sun inside me. The one you see up in the sky doesn't count."



## 7

Three weeks after the ransom demands appeared, a group of neurologists, biochemists, and cell biologists from seventeen nations announced a cure of their own. Sam really didn't care if this was just a cover for paying off the hackers; whether the Nobel committee handed out medals to the researchers and pronounced them the saviors of the world, or some investigative journalist unmasked their work as a recipe their governments had bought on the sly, it would make no difference to whether the antidote worked or not.

But the timetable for the new, synthetic zeitgeber to hit the shelves kept changing. There had to be safety trials, starting on animals; no one could acknowledge prior experiments on monkeys, and in any case Sam wouldn't have wanted the Time Thieves' offering blindly accepted as benign. Then there was the question of manufacturing the substance in sufficient quantities for a fifth of the world's population to take a few milligrams every day.

With each delay, the old scammers bombarded his inbox with new fervor, now offering bootleg versions of the untested cure. Sam remained patient; so long as the end was in sight, he could get through another year the way he had the last two. He'd learned to cherish the brief, glorious "spring," when he woke with the sun and Laura emerged from what seemed like hibernation, to share his bed, and two or three meals a day. And when it slipped away, and he was dragged into the season of broken sleep through the heat of the morning, he told himself: *This is the last time. I can live with anything, one last time.*

## 8

“I don’t want it!” Emma declared vehemently.

“I know,” Sam replied. “But what if you try it for a week, to start with? Just to see what it’s like?”

“No!” Emma was close to tears.

Sam spun the bottle of pills on the table, seeing if he could get it to rotate like a top, but the rattling contents destabilized it. “Then talk to me,” he said. “What is it that you think will be so bad?”

“Everything’s better the way it is,” she insisted. “Why do you want to force me to stop being a runner?”

“Because all the other runners are going to stop. If you try to keep going, you’ll be all alone.”

“Only because they’re being forced as well!”

“Maybe some of them,” Sam conceded. “But we can’t keep the schools open all night for a couple of people. And if it’s been hard to keep up with your friends already, if you don’t switch back with them it will be even harder.”

Emma stared sullenly into her cereal bowl. Sam felt a brief flicker of regret for declining the suggestion from well-meaning colleagues to grind the pills up and slip them into her food.

She’d been awake since three a.m., but Sam had hardened his heart and insisted she not eat until six. This was Realignment Day, and all the zeitgebers had to be lined up in a row. In the end, he’d compromised; it was half past five, and the sky wasn’t dark anymore. Even on Sunday mornings, Laura usually woke at six, and Sam was hoping he could get all the drama over before she joined them.

He rose from the table and switched off the light, then opened the kitchen blinds fully to let the dawn fill the room.

He said, “Remember the time before this happened? You’d always wake up with the birds.” He paused to let her hear the singing from the trees. “And you’d be smiling, full of energy, brighter than anyone else at that hour. Would it be so terrible, going back to that? Were you unhappy then? Honestly?”

Emma said nothing, but after a moment she picked up the pill from the table and swallowed it, then washed it down with orange juice.

He heard the bedroom door open; Laura padded down the hall. “Don’t eat yet!” she implored them. “I want to make pancakes!”

Emma glanced at her cereal, already wet with milk. Sam leaned down and whispered to her, “It’s all right, you can have both. Just finish it while she’s in the shower.”

## 9

“So we factor this term in the denominator ... into what?” Sam turned from the blackboard and looked around the room. “Come on, it’s easy! Anyone?”

Half the class offered no acknowledgment that he’d spoken, while the rest stared back at him uncomprehendingly, as if he’d asked them to compute the square root of a fish. He was facing a new mix of students, but he knew quite a few of them from the runners’ classes, and he knew what they were capable of. “Elena?” he prompted. If she couldn’t answer him, who would?

“You want to cancel one of the terms above?” she struggled.

“Right,” he replied encouragingly. “And that would mean...?”

She frowned and shook her head. “I’m sorry. It’s too hard.”

Sam surveyed the room. No one looked sleepy; if anything, they seemed wired, jittery with nervous energy. The holdouts wouldn’t have shown up at all; any ex-runners here must have dutifully taken their pills.

He glanced out the window. Walking to class beneath the blue sky, picturing the same scene repeating for a thousand days to come, he’d been as elated as if he’d returned from the dead. Surely he wasn’t the only one who felt that way?

“How’s it going for you?” he asked Elena.

“What?” She blinked, confused.

“Are you getting used to the new routine?”

Elena seemed lost for words. “Sure,” she managed eventually. “I’m sticking to the schedule.”

In the staffroom at lunchtime, Dan compared notes with his colleagues. “Oh, the runners are hopeless!” Tom declared bluntly. “I don’t know what your special schools were teaching them, but it’s going to take them months to catch up.”

Gloria said, “They do seem to be struggling. Maybe they’re still a bit jet-lagged from the shift.”

Tom rolled his eyes. “Wasn’t the whole point of the magic potion we shelled out for that it was going to bring them absolutely back into synch?”

Sam could only half follow the accounts of the cure; all he knew was that it helped phosphorylate some crucial proteins in the cells of the suprachiasmatic nucleus, a process that the syndrome’s sufferers had lost the ability to perform in

response to the normal cues. Sunlight itself still couldn't imbue them with wakefulness, but if they took the pill in the morning, the biochemical upshot was meant to be the same.

"Everything takes time," he decided. "Even if it's only old habits that they're fighting. A few more weeks, and they should be back to normal."

That night, the news showed thirty-eight people in handcuffs and orange jumpsuits paraded before the cameras in Shanghai. Prosecutors were claiming that they'd conspired to adulterate a fire-retardant chemical that had been applied to tens of thousands of different products: clothes, toys, furniture. If that was true, the cause of the syndrome might eventually be eliminated worldwide, as all the polluted items were identified and destroyed.

Or just preemptively destroyed. Sam kept Emma distracted while Laura went through her room with a garbage bag.

"What's it like, seeing all your friends at the same time?" he asked. She'd hardly talked to him for the last few days, but however resentful she was at being pressured into taking the zeitgeber, the silent treatment couldn't last forever.

"They're not my friends anymore," Emma replied.

Sam smiled at this hyperbolic declaration; playground politics could be tough for nine-year-olds, but the grudges rarely lasted long.

"Why not?" he asked.

She turned to Sam with a listless expression. "No one's the same as before." Her voice was flat; the last thing she was being was dramatic.

"I think the ex-runners are all a bit..." He didn't know quite how to finish that. No one was dozing off, or zoning out. But everything seemed to be harder for them.

Emma said, "Before, it didn't matter if it was day or night; we had our own sun inside us, and when it was up, it was brighter than the old one. Now you want us to pretend we don't see it anymore."

"It's a big change," Sam conceded. "It will take time to adjust."

Emma smiled thinly. "The pills say *wake up*, and we wake up. We won't ever fall asleep at the wrong time again. But it's like being an animal in a factory farm, pushed along between the rails, going wherever you want us to go."

Sam's gut tightened. "You don't mean that. Everyone has to follow some kind of routine; that's hardly the same as being in prison. You'll get used to it again. You just need to give it time."

Emma gazed at him defiantly for a second or two, but then the energy she'd summoned ebbed away, and she turned back to the TV.

## 10

Laura shuddered fitfully, a sign that she was dreaming, but then she became ominously still. “Aren’t you ever going to sleep?” she asked Sam, exasperated. She turned to the clock beside her. “It’s a quarter past two!”

“I’m sorry.” He didn’t quite know how he managed to disturb her just by lying motionless beside her, but her ability to sense his wakefulness even as she slept only made the prospect of him joining her even more elusive. “Do you want me to move into the office?”

“Don’t be stupid. Those days are over.”

“Maybe they shouldn’t be.”

Laura raised herself up on the pillows and stared at him. The room was almost in darkness, but Sam’s eyes had adapted and he could see her face well enough.

“We can’t just give in to her,” she said. “It was one thing when she had no choice—and when the whole world was willing to accommodate the runners. But if she goes back to it now, it’ll ruin her life. What kind of job could she have? What kind of family?”

“And if we’re crushing all the joy out of her, what will that do?” Sam didn’t want to believe it himself, but he saw it on the faces of the other ex-runners every day.

“This was her thing,” Laura replied. “It made her feel special, and now she’s missing it. It’s like when they moved the children out of London into the countryside during World War Two, to escape the blitz. It was an adventure while it lasted, but now it’s just ... rationing and austerity and having to be normal again.”

Sam couldn’t deny that there might be some truth to that. Even in his early twenties, *the freedom to stay up all night* had seemed sweeter than any other perk of adulthood. If he’d been granted the same ability at Emma’s age, it would have felt like he’d conquered the world, and he would never have given up the power willingly.

“I’m not saying she’s dishonest, at heart,” Laura added. “But she’s nine years old, and she wants what she wants. When I was ten, I faked an illness for three months, without a moment’s compunction. Everyone thought I was an angel back

then, but I would have said anything to get my own way.”

At breakfast, as Sam poured himself a third cup of coffee, Emma glanced at him knowingly: *The pills say wake up, and we wake up*. But unlike him, she’d slept through the night; he’d tiptoed into her room to check, afraid he might find her on the floor making sketches in the dark.

At school, his lessons went like clockwork, and not in a good way: he read from his notes, and transcribed them to the blackboard, barely thinking about what he was saying. His students dutifully wrote it all down. He didn’t pause to ask any questions, as much afraid that he’d lack the concentration to frame them properly as he was that nobody would offer an answer.

In the staffroom, he sat at a table by himself, staring at the noticeboard on the opposite wall, not so much drifting toward sleep as hovering on the verge of a waking hallucination.

Someone clapped him on the shoulders. “You look like shit,” Sadiq announced cheerfully, pulling up a chair.

“But I showed up,” Sam replied. “That’s what we do, isn’t it? Because everything would fall apart if we all just followed our own rhythms.”

“Yeah, very funny. I’ve got to admit it, you proved me wrong: you and your friends made the whole thing work.”

“We did, didn’t we?” Sam managed a bemused smile. “The Apollo missions, the Manhattan Project, Bletchley Park ... and the runners’ schools.”

But the government was never going to let them start up again. It was an open secret that they’d paid their share of the ransom, and whether or not they ever managed to claw the money back from the prisoners’ scattered cyptocurrency accounts, they expected that to be the end of it. No one wanted to hear that the cure that cost so much was worse than the disease. Sam didn’t want to hear it himself.

That night, exhaustion broke the spell: he fell into bed at nine and slept soundly, until Laura shook him awake at half past six. He hadn’t even heard the alarm.

His newfound clarity only made his classes more disturbing. He obtained an official list of ex-runners from the office, so he wouldn’t be relying on his own experience of who he had and hadn’t taught before—and the deficits they were suffering as a group went from anecdotal to indisputable. These kids *showed up*, more convincingly on some levels than any sleep-deprived caffeine zombie, but ... screw the somnograms and the body temperature charts from the clinical tests that had given the green light to the zeitgeber, because his students were *not* okay, however wide-eyed and ambulatory the pills rendered them.

When he raised his observations with Laura, she was skeptical. “Just because Emma’s not the only one dragging her feet doesn’t mean there’s anything more going on here than a collective sulk.”

“Really? You think my seventeen-year-olds—with university admission and job prospects at stake—are willing to shoot themselves in the foot ... because they want to spend their nights, not at wild parties, but with me or some other teacher,

talking about exactly the same things as we talk about by day?"

Laura was unmoved. "Some might be sulking, some might just be suffering from the disruption in their routine: a change of school, a change of teacher. You don't have any evidence that it's anything more."

And Sam still wanted to believe that she was right: that the world would be restored to order, soon enough, just so long as everyone kept their resolve and didn't pander to a few ungrateful runners.

"Are you feeling any better?" he asked Emma, on the drive home.

She didn't answer. He glanced at her; she was gazing out the passenger window. "Did you hear me?"

She said, "Will it make any difference what I say?"

That stung. "Do you think I don't care about you?"

"I think you don't listen. I told you what it's like, before, but that didn't change anything."

There was nothing self-serving in her tone; just a chillingly wary disillusionment. Sam didn't believe she was trying to manipulate him, spinning him stories out of some childish desire to break the shackles of bedtime. "Tell me again. Tell me how you feel, right now."

Emma took a while to reply. "I feel like it's the middle of the night," she said. "As if someone woke me up and dragged me out of bed, and everyone around me wants to do daytime things, but it's not the time for all that. And even if I wanted to join in ... I can't! I can't just pretend and play along with them. I don't have the energy."

"So you're tired?" Sam asked her. "Right now? As if it's midnight?"

"Yes," she agreed. "Tired, but not sleepy. That makes it worse. Even if I lie down in bed, I wouldn't be able to sleep. And I know that when I really want to be reading, or talking to my friends, or playing, the sun will go down and the lights will go out and I'll fall asleep before I can finish my thoughts that I couldn't even think before, in the daytime."

"Okay. I think I understand now." Sam's insomnia messed him up, but it always went away in the end. To have your body going through the motions, day after day, while you were trapped inside, never able to bring yourself into synch, would be a kind of torture.

"I'm sorry I didn't listen to you," he said.

Emma shrugged wearily. "So what now?"

"I don't know," he confessed. "But I'm not giving up; we're going to fix this. Just let me find a way."



# 11

Laura was the first hurdle; Sam couldn't even think about backing away from the "cure" if he didn't have her completely on board.

But Laura needed solid evidence; she'd convinced herself that Emma's testimony alone could never prove anything. Sam was at a loss to imagine how he was meant to prove what none of the labs testing the zeitgeber had even noticed, with all of their expertise and equipment. Then again, they might have been instructed not to look too closely.

It came to him at night, as he stared at the digits of the bedside clock. The idea seemed so simple and right that he closed his eyes and let the afterimage fade, sinking into the darkness, before he could start questioning it. If there were obstacles, he could find them in his dreams.

When he woke, he hadn't changed his mind. He waited until Laura emerged from the shower, and he explained the plan while she was dressing.

"It sort of makes sense," she conceded reluctantly.

"That's not good enough," he pressed her. "Either you commit to this, or you tell me why you won't. No going back on what it means after the fact."

"I can choose the time? Without warning either of you?"

"Yes." Sam wasn't sure if she really believed he'd try to cheat and contrive the outcome, but he was happy to banish any opportunity for doubt.

Momentum was building on another front: the older ex-runners were beginning to disappear from his classes, taking their fate into their own hands. Sam wasn't ready to join them yet, but he'd already had oblique enquiries from some of his ex-colleagues from the runners' school. Just because they couldn't use the same building didn't mean it would be impossible to start again.

Laura bided her time, to the point where Sam began to wonder if she'd lost her nerve and decided to renege. But then, on the fourth night after they'd spoken, she shook him awake.

"You've covered the clock," he observed, amused. She'd also taken his watch from the bedside table.

"That way, you can't give her any secret signals."

"Like Clever Hans?" Sam asked mockingly.

“What?”

“The horse that did arithmetic.”

“Don’t start. Are we going to do this?”

They walked together in the dark to Emma’s room, and Laura knelt beside the bed.

“Darling? Can you wake up for me, please?” She touched Emma’s arm and waited for her to respond.

“What is it?” Emma asked. Her voice was thick with sleep; she sounded like any child woken in the night. Sam’s confidence wavered. He’d committed to the experiment as much as Laura; if it failed, he’d have nothing left to argue.

Laura said, “I just want to know, can you tell me ... what’s the time in your head?”

Sam felt the darkness tipping. If Emma really was still a runner, in some deep place untouched by the zeitgeber, she would still be on the old schedule. But if it was all a ruse, a bid for attention, she’d have long ago forgotten what she was meant to be feeling, at some unknown hour with no clock in sight.

“Ten past ten,” she replied. “In the morning. And I wish I could get up and go outside, but my legs won’t let me.”

Laura started weeping as she handed Sam his watch. The second row of digits she’d summoned from the app read 10:13 AM. “I’m sorry,” she told Emma. “I’m so sorry!”

Emma said, “It’s all right. But can I please stop taking the pills now?”



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# WATER: A HISTORY



K. J. KABZA

# Water: A History

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**K . J . K A B Z A**

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*illustration by*

M A R Y H A A S D Y K

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Her bath is deep and steaming. Light falls from the high windows, splashing the marble with wealth. My grandmother has opened these windows a crack, and wet spring air slithers in.

I stand at the edge of her claw-foot bathtub, its rim up to my naked chest, her glasses in my hand. I pull the stems into my fist and rake the lenses through the water, mesmerized by the ripples.

She stands in the other room, undressing. I can see her age-mottled back in the mirror, skin discolored and papery over muscles straight and strong.

She ties up her hair and sings.



Since Adrianna Fang died last year, I'm the oldest one left. I'm supposed to feel sad and alone, maybe, or at least the chill of my looming mortality, but I don't feel that way at all. Instead, I feel wonderfully unmoored.

I am now the only person in the colony of Isla who has any direct memories of Earth. This means that I can abuse this position at my pleasure and tell them all kinds of bullshit stories they have no way of disputing. It's my way of getting back at them for the way they treat me now: like some kind of minor god rather than a human being.

It's my own fault, I guess. It's what I get for being lucky. Someone like me, who goes outside three or four times a week, ought to have died from cancer by age thirty-five. "Your mutational load is astounding, Marie," Dr. Davies always tells me, but I have yet to get sick.

I didn't know I'd stay this lucky, either. I've been going outside that often ever since the *Rex* touched down—before we knew the surveyor probe had made a terrible mistake, and before we realized what this parched atmosphere would do to us. And I kept going outside even after we did know. By then, both Sadie and I had fallen in love with Quányuán's ferocious desolation, and I figured, well, I've got to die sometime, and if I am to die, let it be because I held hands and took nature walks with her.

When Sadie died, I petitioned the coroner's office for a cremation. She was Earth-born, too, I argued, and people on Earth don't recycle the corpses of their loved ones for biomass. But my petition was denied. Her remains were integrated into the community food supply, and now even that pompous asshole Gilberto has part of her inside of him in some way, which I can't bear to think about.

So when I next went outside, after her remains became thoroughly intermingled

with my own chemical compounds, I peed on a rock. Now some of Sadie's chloride will remain in the wilds of Quányuán, even if her ashes won't.

Unauthorized atmospheric release of water. They gave me a big fine for that one.



There's a girl in Isla named Lian. She's spontaneous, courageous, and kind, and she reminds me so much of Sadie, it makes my heart both ache and sing. I like to imagine a future time when someone will fall for Lian, and she for them, because then something like Sadie and me will be back in the world.

Lian listens to my lies about Earth sometimes. But she isn't intimidated by my age or position. Most people, when they're around me and the subject of water comes up, will pause, secretly hoping I'll offer some revealing anecdote but lacking the nerve to ask. But not Lian. She comes right out with it. "What was Earth like?"

Her directness surprises me out of lying. "Er. Well. The footage pretty much covers it, actually."

"That's not what I meant."

"Mmm," I agree. "Videos aren't the same." I look out the window. I was sitting alone and reading in Lounge Four until Lian came in and politely asked to join me. I could tell she'd sought me out specifically, since nobody else likes to come to Lounge Four to hang out. The room faces the plain instead of the mountains, and the view is nothing but a sea of rock-studded dust for miles and miles. "Let's see. You're, what, sixteen?"

"Yes."

"So that means you did your internship working in the greenhouses last year, is that right?"

"Yes."

"So you know the smell of soil." I clear my throat. "Well, Earth was like putting your nose into fresh-watered greenhouse dirt."

Lian closes her eyes, imagining.

"That dirt smell was everywhere. The whole planet was wet. The oceans tasted like tears, and standing under a waterfall wasn't like taking a shower. It felt like rocks getting dumped on your head." Lian laughs. My real stories about Earth are stupid, nothing but a bunch of disjointed details. But Lian nods for me to keep going, so I do.

"You could take walks every day, for as long as you wanted, and never worry. That's what I miss the most. I lived on the edge of a forest, and my father and I would go walking there, every Sunday morning. He'd tell me all about Earth and all about the stars. It's part of the same universe, he liked to say, so every part is beautiful and worth knowing about."



Lian nods, her eyes still closed.

My chest aches for her. Lian will never walk in a forest, not with anyone. "That's how I got to Quányuán. You had to be eighteen to sign up for the colony ship, unless you came with a parent. My father was one of the engineers who designed the *Rex*, and the government asked him to go. I could've stayed on Earth with my grandmother, but I wouldn't let him leave without me. I was nine years old." I shift in my seat, but it's not that kind of discomfort. "Sorry. I'm rambling. You asked about Earth, not me."

Lian opens her eyes and smiles.

"Why are you even asking me? Is this for some kind of school project?"

"No," says Lian. "I just wanted to talk to you. About stuff. Like—I was wondering." She looks out the window again. "I've never ... I mean how do you ... do you just go outside?"

I don't know what she's asking. "On Earth? Sure. Almost every building is freestanding, and they all have doors that go directly outside. So you—"

"No," she says. "I mean if I wanted to go outside here. Would I just—do it like you?"

I stare at her. A goofy grin unrolls across her face, revealing gaps in her teeth. Her expression is raw with excitement. "You just ... go. When you do it. Right?"

I open my mouth. I've never been a mom, but a mom-like tirade comes to mind: You can't just go, you have to save up some money, you have to pay the fee and file for a permit, you have to cover every inch of skin with two rounds of sunscreen, you have to wear long pants and long sleeves and a special hat, and even though I don't wear gloves, I'm an idiot, so you shouldn't do what I do. And even I still have to wear a water pack and keep the end of the hose in my mouth so I can sip from it continuously the entire time I'm out there, because while I am an idiot, I don't have a death wish.

But I say none of this.

Lian turns shy. "I want to know what Quányuán smells like. And I want to feel wind."

My chest aches again. "Quányuán smells like rock and heat. And wind just feels like a fan."

"Stories are better than video footage," says Lian. She looks down at her hands and picks at a hangnail. "But they aren't the same, either."

I remember myself at her age, when Sadie and I once pressed our faces against an east-facing window, watching the xenogeologists take soil samples in search of the permafrost and water-rich aquifers our survey probe was so very wrong about. Their newest devil-may-care game was taking off their exosuit helmets to pull in deep lungfuls of alien air. My cheeks grew wet, and when Sadie asked what was wrong, all I could say was, The woods, my woods, I want to go outside and walk in the woods.

Does Lian dream of trees?



My throat is dry, as if I've just played a round of the xenogeologists' game. "Listen," I say. "If you've never been outside before without an exosuit, it's probably smart if you go with a partner."

Lian looks up, her face hopeful and eager.

Twelve days later, Lian and I stand together in Airlock Twenty-Three, our water tubes ready in our mouths. Her greasy bare hand is entwined in mine, and my fingers tingle with somebody's pulse.



It becomes a regular thing.

"Isn't it heartwarming?" "Isn't it cute?" "That poor woman—she never had any children, you know, and isn't it just so *nice* of Lian to keep her company?"

The gossips in Isla don't know. Fools. Once again, I'm lucky. If I were fifty years younger—but I'm not. All they see is a lonely old lady and a child who never knew her grandmother. Well, that's okay, because that's true, too.

I show her around. The Four Brothers (rock formation), Little Mountain (big rock formation), the Dais (rock formation you can climb on). There isn't much "around" to show, really, without an exosuit. You can only walk so far in five minutes.

Mostly we sit and look, sipping water between occasional sentences. Lian plays in the dust like a toddler, and sometimes, I join her. We roll pebbles across the Dais. We stack up rocks in the Graveyard, where many walkers, including my past selves, have made rock towers. I point out the ones that Sadie made. Quányuán has no storms to topple them. "This is a game from Earth," I say, from around my water tube. "I used to make these with my father."

When three hundred seconds elapse, the issued alarms on our wrists beep, and it's time to go back. Alone in our rooms, we recover from dehydration, coping with headaches, irritability, and exhaustion. Dr. Davies warns me that I'm way too old for this. Under the guise of argument, I tell her a long and passionate lie about hiking the Appalachian Trail at age fifteen with nothing but a buck knife, a compass, and a half-liter water bottle, but the art is lost on her. Nobody on Quányuán remembers Appalachia.

One day, Lian and I sit on a rock and look north. We're by Airlock Twenty-One, which is next to the middle school. A handful of kids are crammed against the windows and snickering at us, but I'll get back at them when the school asks me to speak there on History Day. "I've switched my career track," says Lian.

"Hmm?"

"I'm going to be a miner."

I smile. "How exciting."

"Thank god *somebody* thinks so." Lian sips her water. "My mom says it's a waste of my talent."

"Your mom would do well to remember that if it weren't for the miners, we'd all be dead."

"I know, right?" Lian squints north, as if she can see across twenty miles of nothing to the entrance to the nearest ice mine. "And they need people now more than ever. Did you hear about the—"

I wave my hand to both acknowledge and silence. Fifty years of news stories about another depleted subsurface ice vein and everyone on Quányuán someday dying of thirst get tiresome. "You'll make a great miner," I say. "And with an exosuit on, you'll get to stay outside for hours."

Lian nods and sips. "Have you done it? Taken walks around here in an exosuit? The permit's much cheaper."

"I know. And I did, for a while, in the beginning." I sip, too. "But not for a long time now. It's not the same."

Lian smiles around her tube. She reaches down and scoops up a handful of fine, powdery dust. It floats through her fingers like a cloud, staining her palms and making us both laugh and cough by turns. "Not the same at all," she agrees.

On my next visit to Dr. Davies, a routine follow-up for some labs, she folds her hands and gives me the Look. It's a funny kind of relief to finally receive it, after waiting so long.

The cancer has come at last.

Damn.



I talk about it at length with Sadie's nonexistent ghost that night, before we fall asleep. I'm troubled. For over a decade, we had it all planned out: assuming it was cancer, I'd go outside for one final walk, lie down by Sadie's tallest rock tower (and her chloride), and die a fitting and deliciously romantic death.

But lovestruck notions, while heady, are delicate. The littlest whiff of reality pops them. In my mind, Sadie's voice points out that, as soon as my wrist alarm went off and failed to show me moving on a homeward trajectory, the Office of Exodus would dispatch a rescue team, and that would be the end of my dramatic gesture.

And then there's the matter of my nutrient-rich biomass. I'm not as sentimental as I once was, and if I went outside to die, I'd be depriving a number of living people (whom I might not like very much—but that's beside the point) of my body's minerals. I'm no heroic ice-miner-to-be, like Lian, and if I'm honest with myself, I haven't done very much for Isla, either. When I worked, I was a clerk in the city records department; now that I don't, I tell lies about a planet we cannot return to. The least I can do is not rob my brethren of my literal pound of flesh.

Sadie says it doesn't matter how I die, because she'll be with me wherever I go. I tell her I'm glad.



When she binds up her hair and sings, my grandmother's voice is clear. Years later, when I recall my childhood on Earth in a jumble of steaming bathwater and golden light, I'll remember, too, the clarity of her voice, clean and hot like water, deep and pure like water. I swear to god, I'll go swimming in the north Atlantic at age nine with my cousins, the summer before my father and I board the *Rex*, and when I look down through that green-glass sea right to the bottom, I will think of her.

Earth is wet. The whole planet is wet, and the oceans taste of tears.



"I'm dying," I say.

Lian and I are inside, for once, sitting in Greenhouse Eight. The smells of plants envelop us. It's night, and up above, past whatever complicated synthetic comprises the ceiling, blaze the stars. With no clouds to soften the blow, the night sky of Quányuán is frightening in its intensity and color.

Lian looks at her lap. Her hair falls forward, and I cannot see her face.

"I'm sorry," I say.

She nods. Her chest moves quickly. "Cancer," she says.

"I'm not surprised, either."

Her fists clench and unclench. For a long time, neither of us speaks. I get the grim and heavy feeling that I've fucked this up, but how else was I supposed to say it?

"I'm sorry. I didn't mean to upset you. I mean—I thought you should know. Since you've ... since you're my friend." For a moment I feel small and oddly ashamed. Friends with a child? Marie, what are you even doing?

Then one of her clenching hands grabs mine. Away from sterile Quányuán, her fingers are smooth and firm. Mine must feel so revoltingly old to her—fragile and cool, the way my grandmother's used to feel—but Lian hangs on.

"You're my friend, too," she cries.

I feel even worse.

"This is my fault. If I hadn't found you and asked you about going outside—"

"No no. No no no no. I would've kept going out. You know that. Hell, I'm worried about *you*, going outside so often, so young."

She wipes her eyes. "I have every right—"

"Then so do I. I knew the risks, I went outside, and here we are. That's life."

Lian snuffles and does a terrible job of controlling herself. Sadie says, I love you, but you're being a selfish old crab right now. About what? I demand, but Sadie only makes that little hissing noise between her teeth.

"Listen. Lian. Don't. It'll be fine. Look at me. I'm happy. I got to have plenty

of wind and sunshine, and I've seen sunrises and I've watched the stars come out, and most people in Isla can't say that. It's been a good life. I've no regrets. Okay, I do regret that I can't have a spectacular death outside by Sadie's Tower, but if that's the only thing wrong, then I can't complain."

Lian still won't look at me. "Can we go outside one last time?"

"Until I'm a pile of bones, my dear, we can go outside as many times as you wish."



We sit in the Graveyard, facing each other. The rock towers glow, shadowless, from the everywhere-illumination of Quányuán's night sky. I'm reminded of sitting at the bottom of my cousins' swimming pool, our legs crossed as we faced each other in pairs, miming sipping from teacups with our pinkies extended. Having a tea party, we called it. Try to make the other person laugh and force them to surface for air before you do.

Lian looks at her alarm. We have 272 seconds.

"I guess this is the closest thing Quányuán has to a forest," says Lian. "Or at least, the closest thing there is to a forest around here."

I smile. "Thank you."

"I mean—"

"I know."

Sadie leans over to see past my shoulder and through the little sprouts of rock, as though checking to see we weren't followed out of the airlock. "Are you ready?" Lian asks.

"Hmm?"

She sits back. Her face is very serious, even when she puckers her lips to sip on her water tube. "If you were to die right now. Would you be ready?"

Now I'm the one looking around. "What? Here? Tonight?"

Lian looks uncomfortable. She nods.

"Well, sure," I say. "It would be as good a time as any, I suppose. Why do you ask?"

She holds out her hand. "Give me your alarm."

The request seems so banal. I remove it and hand it over, as if she's asked to inspect a piece of costume jewelry. I'm not sure what's happening. "What are you doing?"

"I'll take it inside with me," she says. "I'll spend a long time in the airlock, as if we're standing there talking. By the time I come inside and check in with the Exodus desk ..." She looks away.

I open my mouth, then close it swiftly around my drinking tube to prevent all that moisture from being sucked away. "Lian—"

"I've thought about it," she says stubbornly. "They won't do anything to me."

They need miners too badly, and you're old and sick, and I think everyone would secretly be happy if they heard you got to die outside. She died doing what she loved. You know that's what they'll say."

I don't want to argue. I feel like I have to. "My biomass—"

"—will get picked up later by a rescue squad, so what does it matter?"

I fall silent. I sip at my water tube.

Lian stands, surfacing for air.

I look at her, so smooth and beautiful under the fierce light, my wrist alarm in one clenched hand. Her face melts. "Thank you, Marie," she whispers.

"Thank you, Lian," I say.

"I'll miss you."

I almost say Me, too, but in a few moments, I won't be able to miss anything. Not even Sadie. So I just say, "It was a privilege to know you."

She nods.

Her alarm chirps. Mine chimes in. She turns and moves back to the airlock, so very slowly, weaving in and out among the knee-high towers, as if they really were stupendous trees, each trunk a new horizon.

The airlock yawns open. Gold light splashes over the wasteland. Is swallowed.

Alone in my forest, under Sadie's tree, I remove the water pack from my back. There's still about one third left. I hold it above my head with one hand, then I yank out the drinking tube with the other.

I tip my face up to the rain.



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# **AS THE LAST I MAY KNOW**

**S. L. HUANG**

# As the Last I May Know

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**S . L . H U A N G**

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*illustration by*

S C O T T B A K A L

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A growing crowd of protesters trudged doggedly through the flurrying snow, bundled up into roundness against the cold until they resembled determined beetles. Back and forth they went, marching in a wobbly loop, their heads down against the wind but their voices strident as they fell into a chant:

*Don't kill children, kill the seres!  
Before we all destroy ourselves!*

Up in the window of the garret three stories above, Nyma watched them trundle and call. They didn't have a very good chant, she couldn't help thinking. "Seres" wasn't even a hard word to rhyme—*fears, years, tears* ...

She leaned her forehead against the window pane. The glass was cold.

She hadn't yet felt the presence of her tutor in the doorway behind her. In truth, Tej had opened his mouth to speak out several times, only to swallow back the frigid air instead. He was, if he were to scrape away any illusions—and Tej was not a man who lied to himself, when he could avoid it—trying to best himself in a moral struggle.

He failed.

"You shouldn't watch that," he said to Nyma. Peace help him, but the garret was freezing. He folded his hands into the sleeves of his robe, wondering how Nyma wasn't shivering.

Children were always so resilient. Too resilient.

"It's my job now," Nyma said into the window, the words fog on the pane.

"It doesn't have to be." Now that he'd broken, the words tumbled out of Tej like they wanted to barb into the child's heart and keep her here. "You understand that, right? You can—you can say no."

Nyma knew. Her tutors had taught her: she would always have a choice. But they'd also taught her why her duties were so vital, and why those duties had to be done by someone young, if not her then one of her classmates.

And she believed them. She believed in the Order and everything it stood for.

Dying scared her. A lot. The idea of it was so impossibly big and black that she couldn't even hold it in her head. But it didn't scare her enough to break the faith—not when her name had been the one drawn.

Of course, the news feeds said she shouldn't be allowed to choose this life at all, blasting the Order for following the old ways. *Ten-year-olds are too young to agree to this; they can't make that decision for themselves; it's inhumane!* Some of those people wanted the Order disbanded. Some of them wanted only adults to follow its dictates, people who had passed the magic threshold of being able to say yes to saving the world.

Those same news feeds were markedly less certain whether butchering the Order's traditions should also mean dismantling the nation's stockpile of sere missiles.

"You taught me," Nyma said to Tej. "It's important. We're important."

*Not as important as your life,* Tej wanted to cry, wanted to fold her into him like his own daughter instead of one of his pupils, even as that betrayed every fiber of what he'd always fought for. "It doesn't have to be you," he managed instead. "We didn't know it would be like—this. You can say no to it. To him."

Nyma turned from the window, her freckles blotching dark on her pale skin, her eyes so large they took up half her face. "He's scary," she whispered. "Will you come with me? When I have to meet him?"

Tej had to turn away, then, because it wouldn't do for Nyma to see one of her tutors weep.



Nobody thought Otto Han would win the election. He was the quiet outsider candidate, the one who'd kept pecking at his place in the polls until he rose up when all the others had shouted themselves out.

He wasn't even the one who had most worried the Order, at first—that honor had gone to the demagogue candidate who fanned the flames of mounting war until her supporters screamed in violent ecstasy. She had burned out brighter and faster than the swell of rage she had dug from the populace. The tension in the Order had fallen into palpable relief when she'd plummeted in public opinion, even as she'd left behind a smear of

angry demonstrators yelling, “*We have seres, we should use them!*”

They didn’t understand, those people. They had forgotten. The Order was built not to forget.

It wasn’t until two weeks before the election that a reporter asked Otto Han his opinion of sere missiles. “I think if it makes the most military sense for the protection of our nation, we need to use every tool at our disposal,” he’d answered. “We’re at war. Everything should be on the table.”

The reply sparked panic in the Order, but got far too little notoriety elsewhere. The Order Elders wired their contacts in the feeds, begging other newsfolk to press Han hard and ask the important questions, before it was too late:

*How can you justify a weapon that will vaporize an entire city in a single instant—buildings, children, hospitals, prisoners of war, millions of innocent civilian people, everything for so many hundreds of miles—gone? How is that not a war crime?*

*How can you reconcile that with history, our history, as the only country in the world who has had sere weapons used against us? How can you do what we have always considered the unthinkable?*

And, the most relevant one to a ten-year-old Order girl and those who knew her:

*Do you truly wish to use such weapons so badly, that you would be willing to do as the law requires and murder a child of your own land with your own hands in order to gain access to them?*

But there hadn’t been time. Nobody had asked Han any of those questions until after he’d already won.

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The poem Nyma returned to most often had been written by Akuta Myssoutoi two hundred years ago, after he’d lost everyone in his family in the destruction of the Capital.

*The snow falls over nothing.  
I beg three small graves to place incense  
But echos have no tombs.*

The bleakness of it had been a touchstone for the beliefs she’d been

raised with, a reaffirmation of the Order's righteousness.

Now the words of that final stanza kept circling in her head, echoing dully. Behind them loomed the granite image of President Otto Han, standing above her with a knife, his hands soaked crimson with her blood.

She gripped Tej's hand. Fear made all her senses too sharp.

It was okay to be scared, right? As long as she did her duty. Her chest ached over the scar where the surgeons had put the capsule in. It had been over a month ago now, after the election but before Han's induction into office. In that time, the ache felt like it had become a part of her.

She and Tej walked together down the long archways of the Capital, the metal and stone gleaming into the sky around them. One tall dark man, one small pale girl, and no one could have said who was grasping whose hand more tightly.

When they reached the Tower, the new president did not keep them waiting. A series of smartly dressed staff showed them in with no delay, not even a question as to who they might be. Even if their robes had not marked them out, their faces were already known here.

Otto Han rose from behind his desk to greet them in a stiff but polite bow. Tej bowed equally stiffly in return.

*He's so much bigger in person*, Nyma thought numbly. And he was hard. Like if you touched him, your hand would break.

"Elder Rokaya," he said to Tej, in something that passed for a greeting. "And this must be my carrier."

"Yes, sir," said Nyma. "My name is—"

"I don't want to know your name." He turned back to Tej. "You Order priests are animals. This is barbaric."

"Her name is Nyma," Tej said quietly, but his thoughts were not so calm. *Seres are what is barbaric. Whether to engage in such barbarism is your choice, not ours.* The president could say, right now, that he would not use the weapons that defied all humanity and could spell the end of every life on their world. He could proclaim that Nyma would be safe and that the position would be as ceremonial as it had been in the past.

He was the one who refused.

"I've been briefed," Han said. "And I said to my generals, it's hundreds of years later, *surely* we have a better way of doing this. But you people have embedded yourselves right in the roots of our laws, haven't you?"

“We think it’s the best way, sir.” It wasn’t Tej who had spoken, but Nyma, forcing the words around the dryness in her mouth. *You must talk to the president. You must be a part of their mind, their life.* Her tutors’ words were a drumbeat in her head.

Han wrested his attention around to her, and Nyma quailed.

“Of course you do,” he said. He turned back to Tej. “You people teach her to say this, and then if I need the codes for the weapons that could protect us all, you put them inside a child and tell me I have to slaughter her. You’re despicable.”

Tej had to force his expression to stillness. “Sir.”

“Do you know what the Baron Islands are doing to our people in the southern territories *right now*? Do you know what they’ve promised to do to the people of Koivu and Mikata? Koivu has sere missiles themselves. If the Islanders get a hold of that technology ... trust me, they won’t force their leaders to kill little girls in order to use them. Even if they did, those leaders wouldn’t hesitate.”

Tej could have argued every one of those points for hours. He could have pointed out balances of power and morality, or expounded on the Order’s core belief, that *no one* should be able to push a button from the sanctuary of an office and kill so many faceless children far away if they could not see the justification to execute the one in front of them.

Without such a burden, how would any president fully understand what he did when he asked to use such weapons?

“I’m told she’s to be a bodyman to me,” Han said. “I’m told I can’t say no.”

“That’s correct, sir,” Tej answered. The carrier had to be always physically nearby in case she was, Peace forbid, needed. That part was for the president. But if she could also form an emotional closeness, it might save not only her life but the lives of millions, and that was the mission of the Order.

“All right, Elder, you’re dismissed. Nyma, was it?” He towered over her.

“Yes, sir.”

“I hope you know. I don’t want this.”

Nyma didn’t know how to reply. Did she want this, just because she had chosen it? Did the Order want it, because they believed it was necessary? Did anybody want it?

Another verse from the same Myssoutoi poem swirled through her head.

*I listened to us surrender on the wireless.  
No choice, they said.  
They said the same when we went to war.*

Nyma sat in the corner of the president's Tower office, biting the end of her stylus. It was a bad habit of hers, one her teachers had tried hard to break her of but had always failed. She wore Tower livery now, her thin hair braided neatly like the ushers and servants, but everyone still knew—she saw it in the way they walked in arcs around her, or whispered while not looking her way.

“What are you thinking about so hard over there?”

Nyma jumped. Try as she had to engage him, Otto Han had barely spoken to her if he could avoid it. He thanked her when she brought him files or drinks or carried his things, but he'd certainly never asked her a question.

“I'm trying to think of a rhyme, sir,” she answered honestly.

“A rhyme? Whatever for?”

“I like poetry.” She closed her pad and turned so she could face where he sat at the wide presidential desk. “I know it doesn't always have to rhyme. But I'm not a good enough poetess yet to do the unrhyming ones.”

“Poetess, eh? All right, let's hear one.”

A warm flush crept up Nyma's neck. Her Order tutors had encouraged her interest—it was always good for carriers to be full people, they said, children with personalities who would be missed if they were gone, and besides that, the hope was that even those chosen would always have an adult life to grow into. But Nyma had never recited one of her poems aloud before.

Most of the ones she'd written lately were bleak. Just yesterday she'd composed a verse titled “Next Year?” with the lines, *Peach petals drift down / Cheerful pink snow / And I clasp them to me / As the last I may know.*

The president was still far too intimidating to share that one with. What if he shouted at her? Worse, what if he brushed it off, or laughed, when he was the one who held the answer to the question in his hands?

“Here’s one I wrote when we were visiting the farming country a few weeks ago,” she said, after rapidly deciding what might be harmless to recite. Pretty farms were safe, right? She took a breath and plunged in before nerves could steal her tongue.

She managed to get through all five stanzas, but trailed off as she got to the end. Otto Han was smiling. She hadn’t known he *could* smile.

“You made that up all by yourself?” he said, when she had stopped.

“Yes, sir.”

“Well, I’ll be.” He rose and came over to stand next to her, staring out the Tower windows to the shiny quilt of the Capital below. “I love our people, Nyma. Can you understand that?”

“I think so, sir.” Nyma loved their people too. She’d been taught their nation’s history since before she could walk. “I think I love all people. But one thing I love most about us is how important other countries’ people are to us, too.”

“Ah. Your Order.” He rested a brief, rough hand on her shoulder. “I still don’t agree. But I’d be more than glad for you to grow up to argue with me about it.”

“Sir?”

His mouth quirked. “I shouldn’t say, but—you deserve to know. The war’s going well. It’s all going well. We got news today that—mmm, let’s just say I don’t think I’m going to have to make any decisions nobody should have to make.”

A queer, swoopy feeling fluttered through Nyma’s stomach.

“Mind you, I still think you being here is barbaric,” Han continued.

In a burst of courage, Nyma slipped to her feet and grabbed the president’s arm. “What do you see?” she said. “When you look out these windows at the Capital, and all the people and buildings, what do you see?”

He glanced down at her, surprise writ clear on his expression. “I suppose I see ... progress. Prosperity. Things worth protecting.”

“In the Order they teach us to look at the city and imagine it ... imagine what happened two hundred years ago,” Nyma said. “They say not to think about the whole city, that’s too big. You have to look at the small things.” She pointed at the streets that crisscrossed below them. “Like that woman in the green coat. Just—gone. She’s gone. The couple holding hands over by the pigeons. They’re gone, too. All the pigeons, and

the street, and that shop selling flowers, and the kids playing in front of it. And then you think about your family. If you have parents, or friends, anyone you love—how they could also just be gone, all at once.” She licked her lips. It was the longest she’d ever talked in a row to the president. “The whole *city*. Two hundred years ago, that happened. The Havenites *did that* to us. That’s what I see. And I can’t bear the thought of it happening again, to anyone.”

She half expected him to tell her this was only what she had been taught from the mouths of meddling grown-ups. But he didn’t. Instead he said, “Do you have a family, Nyma?”

The question surprised her. “My parents were both in the Order, sir. They were raising me that way too, but they died in a tram crash when I was a baby and left me with the Elders. It’s a good education.”

“With a price. Do the Elders let you have friends?”

“Of course. My friends can’t visit me much here, but we write to each other.” The writing had dropped off of late. It made Nyma’s heart give a funny little twist. Her classmates didn’t seem to know how to speak to her now that she had been chosen—now that she had been chosen and they hadn’t. “And some of my tutors are my friends. Like Tej.”

Han made a noncommittal sound. “Tell me, Nyma. Do you write poetry about all this?”

“Yes, sir.”

“Peace knows you shouldn’t have to listen to anything I say, but I think ... I think you should keep on doing that. Is that all right?”

“Yes, sir.” It had never occurred to her to stop.



Nyma was off with the presidential cadre on a diplomatic trip the day she turned twelve years old, but when she returned the following week, Tej brought a box of birthday teacakes to their class session.

“You remembered!” she said, delighted. The Tower staff kept a log and the ushers had made sure she got very traditional, professionally sugared teacakes on the day, but it was different when someone thought of you.

“How was the trip?” Tej asked.

Nyma closed the box and set it aside, careful not to drag her dagged



sleeve in the sugar. She'd asked to stop wearing Tower livery of late—she wasn't required to, and she found she liked having a say in designing outfits for herself. All under the watchful eye of the Tower communications staff, of course.

Besides, she was grateful to find one more distraction from the ever-pressing weight of the air around her.

"Nyma?"

"The feeds aren't always right, you know. About the war." She played with the hem of her sleeve instead of looking at Tej. "But I can always tell when it's bad, because he stops talking to me."

*Cowardice*, Tej wanted to say, but didn't. They'd all been so hopeful this war would end two years ago. Instead it had dragged. And dragged.

And now the murmurs were becoming pointed shouts, and the editorials kept mentioning the words "land invasion." Their nation hadn't suffered a conflict on its own soil in two hundred years.

Tej was of the opinion that they'd earned that tranquility by striving so hard to be a force for peace. His countrymen didn't seem so certain. Nyma's ear might be on the feeds and the president's mood, but Tej's was on the populace, the growing rumbles of anger and discontent. That was what he feared most of all.

"Nyma," he said. "I had a thought while you were away. Are you still writing?"

Her head came up in surprise. "You mean, writing poetry? Of course."

"I think," Tej said, "that we should publish some of it. A book."

"My poems? But I'm—" *Not good enough, still a child, still learning?* "I'm not sure I'm—that's like a dream, to be *published*, but Tej, I don't even know if I have enough. I'm already embarrassed of what I wrote last year."

"The ones you gave me last year for composition lessons were quite impressive," he said, truthfully. It had still perhaps been obvious they had been from the hand of a child, but the emotion that bled between the lines had wrenched him. "We'll have an editor help you. What do you think?"

"I don't ... I mean, I..." She couldn't have said why, but it didn't feel right. It was all too easy. If she weren't the president's carrier, she'd have to keep working at it, scraping and practicing until her verses caught the eye of a professional, wouldn't she?

But if she weren't the president's carrier, she'd have a lifetime of years

for that.

“All right,” she said to Tej. She felt real and unreal, excited and not excited, all balled up like twine in her heart.

He flashed her a quick, tight smile. “Good. You know, Nyma, it takes more than soldiers to win a war.”

She blinked. “But the Islanders won’t even be able to read my poems. Unless they’re translated or something.”

“That’s not the only war we’re fighting.”



Whether from morbidity or compassion or their own ideological motivations, the nation’s people devoured the book of poems titled *The Girl in the Tower*. Presses clacked overnight, every night, binding up more copies, and Nyma’s name fell in too-careful droplets from everyone’s lips.

She thought she’d become used to the stares and whispers, but now public focus riveted on her like it wanted to drag her under the waves. The Tower communications staff had to block out a cascade of interview requests; the few profiles Nyma did do exploded and thrived across the feeds. Her photograph seemed to be plastered everywhere—almost always a solemn portrait that had been taken with dark lighting over a sea-green dress. It made her appear a waif. Nyma hated it, but candid captures of her laughing in the sun and wearing gold or pink seemed not to fit the feeds’ narrative.

The protesters called her out by name now. It wasn’t only abstract carrier “children” they chanted and opined about, but Nyma, the Poet in the Tower, who deserved to grow old, who was the fire and rallying symbol of everyone who opposed the use of seres.

President Han wasn’t happy.

He was a good enough man that he did not lose his temper to Nyma about it, though he might have glowered in her direction more than a few times, after interviewers asked him with appalling directness whether he could truly imagine himself sliding a blade between her ribs and tearing open her heart. But he did summon Tej to him.

“You’re using her. You’re despicable.”

Tej kept his hands folded before him, a picture of tranquility he hoped would be maddening. “Nyma believes in what we do. Would you really be

so heartless as to tell her she can't speak for herself?"

"Damn you, man! Do you think I'd ever use the blasted things if I thought I had a choice? And you want to pinch us between annihilation from overseas and a bloodbath in our own country if I have to dirty my hands the way *you* people set me up to? You think that won't be the hardest day of my cursed life already?"

"I feel little pity for that," Tej said dryly, "seeing as it would be the last day of Nyma's."

Had Nyma herself heard the conversation, it only would have intensified the confused resentment that had been building in her toward both men. It sat in her throat, an unhappy lump. She'd always remained a little afraid of the president, no matter how much time she'd spent with him, but the anger edging her fear—that was new. Wasn't this her duty? But what right did Han have to react so blackly to her having spoken what she felt?

Didn't she deserve to be her own person, for whatever time she did have?

Her ill will toward Tej was more complicated. He cared for her, that she knew; and he had always been so careful in reminding her she had choices, even more than the other Elders. But ... she didn't want to be the trapped waif who emerged flatly from *his* campaign, either.

She didn't know how, after so many people had read what was in her heart, she could feel so much like she had no voice.



Nyma made it two months past the day she turned thirteen before the air raid sirens screamed into the night and the first shelling rocked the Capital.

She followed what they'd drilled so many times now, quickly and automatically, her pulse hammering her ribs and chasing out any emotion. Only minutes later she huddled in the shelter, still in her nightdress, between the Minister of War and the Chief Transportation Administrator. She hugged her hands under her arms, but her palms wouldn't get warm.

The Minister of War was called into the next room for a council with the president. Nyma hunched against the wall. There were no windows. *Like a prison cell*, she thought. *Trapped inside our own safety.*

But she wasn't safe here. She was all inside out, waiting for her own

death when everyone else sighed in relieved protection.

There was a poem in that, but she couldn't concentrate to draw it out.

She put a hand over her thudding heart. She fancied she could feel the capsule with the sere codes pushing against her fingers.

But the president didn't summon her that night. Or the next. Or the next, when the air raid siren klaxoned again. It took seventy-four days, the fall of three strategic outposts, and an occupying force on the outer peninsula for the call to come.

When Nyma entered the room, President Han was alone, and he was crying.

He took her hands. His were wet with his own tears, but Nyma was numb.

"I'm sorry," he said, through hiccuping breaths. "I'm so sorry."

Nyma's whole face began to prickle then. She wanted to have some deep, profound last thoughts, but her mind was a blank.

She tried to keep breathing. It was hard.

"If you want—some time, to say goodbye to people, or—"

"Get it over with now, please." She could be brave, if he did it now. She didn't want to live one more afternoon with this miserable finality crushing her.

The president detached his hands from hers as if he had to unclench them. He went to his desk and opened an ornate, ceremonial box.

Inside was a dagger. Its sleek blade hooked into Nyma's gaze and wouldn't let her go.

The president pushed a buzzer. Several advisors and generals came into the office. Tall, unsmiling, faces grave.

"Witness," the president mumbled. "As signed by the Council..."

He reached for the dagger's hilt. His hand shook.

Nyma felt no sympathy. She hoped his hand would shake so much he dropped it.

And then—it did. He did.

The dagger clattered to the desk.

"*Find me another way!*" The words tore forth, bowling into his generals, and Nyma had never seen him so angry. He whirled on Nyma. "*Get out!*"

She ran.

She didn't stop until she was back in her quarters, and then her legs

went out on her, all wobbly and backward, and she collapsed on the woven floor mats, shuddering. Her breath heaved in and out, too fast and too ragged, and then the breaths caught and turned to ugly, wrenching sobs, and she couldn't stop trembling.

*He's going to call me back, he's going to call me back, he's going to call me back and he's going to do it—*

But he didn't. The sun set, and Nyma couldn't sleep, and the next day Tej came to see her.



He burst into her suite and gathered her up in an embrace so tight she couldn't breathe.

"Nyma, I—I heard, I came as soon as—"

She pushed out of his grasp. She didn't want to cry again. She couldn't comfort him on top of herself.

Tej had a wildness in his eyes. "I have, I have a plan. I'm one of the Elders who—when a new president is elected, and a new carrier chosen, we have to, the codes have to be reset and a new capsule made, and I have access—Nyma, you can run away from this. I'll help you. We can do it tonight."

She fought the sudden urge to vomit. If she ran, it would just be one of her classmates chosen instead. Why would he ask that of her?

"Who would you choose instead of me, then?" she cried. "You think I would pick someone else to die?"

"No. No." The wildness burst from Tej's face like he had lost reality. In truth, he hadn't slept at all, frantically preparing, sneaking every piece of groundwork into place, half hoping he would be caught while simultaneously terrified of the consequences of his treason. All that remained was for Nyma to agree. And still, trying to speak these words aloud was beyond the worst hell he'd ever conceived. "We won't put the codes in anyone else. I'll reset them from yours and deliver them to the president. Nobody—nobody needs to die for this. Not you, not anybody. Please."

She recoiled from him. "What?"

"I've arranged security so—I can do it. Please, Nyma, I'm begging you."

Fury welled up in Nyma, eclipsing her feverish panic. How dare he? How dare he offer her a way out, a way to gallivant off into the night, and still give the president what he wanted? It wasn't *right*, that was why there was a carrier, so there was a *cost*, and hadn't Tej been the one who taught her so? "You can't do that!"

"No, it's different now." He turned his face away from her. He'd never questioned the mission of the Order, not once—not until he stood here on the precipice of destroying it. "Maybe sometimes—this decision—people are *dying*, Nyma. You're here in the Tower and all the security and you don't see—I walk through the streets, and there aren't even enough hands to carry away the bodies. Rubble everywhere, and the dust, and the fear, and—I'm afraid. I'm afraid. Nyma..."

He closed his eyes. They hadn't stopped burning for weeks.

"You think we should use seres," Nyma said slowly. "You think we should use them."

"I don't—I don't know."

His eyes were still closed, but he felt her hand on his sleeve.

"That's why there's a carrier," she said "That's why we didn't just get rid of them all—in case we ever do have to. But it should be—it should be desperate. Right? That's why I'm here. To make sure."

"I don't know what's right anymore," Tej whispered.

Nyma wondered if this was what it felt like to stop being a child.

"It's not about right and wrong," she said to him. "It's about making it hard."



Nyma sat in her quarters in the Tower, waiting.

The klaxons rang out every night now. Smoke and dust masked the Capital streets, but whenever the wind whisked it away, the soaring arches and towering buildings had crumbled into successive layers of ruin.

She gazed out the window and wondered if her death could save them all, or if it would only lead to so many mirrors of herself being massacred, all for the crime of a birth on enemy land.

Or maybe this was the end of everything. Their enemy didn't have seres themselves, but they had allies who did. If the president ... it didn't comfort her, thinking of her own death as only the first in senseless

billions, imagining that the world would outlast her by mere weeks before becoming a blank wasteland.

*Why?* she wondered emptily. *Nobody wins.*

She smoothed the press of her skirts and picked up her stylus. Opened her pad.

She didn't feel like searching for rhymes, today. But maybe she was past needing to.

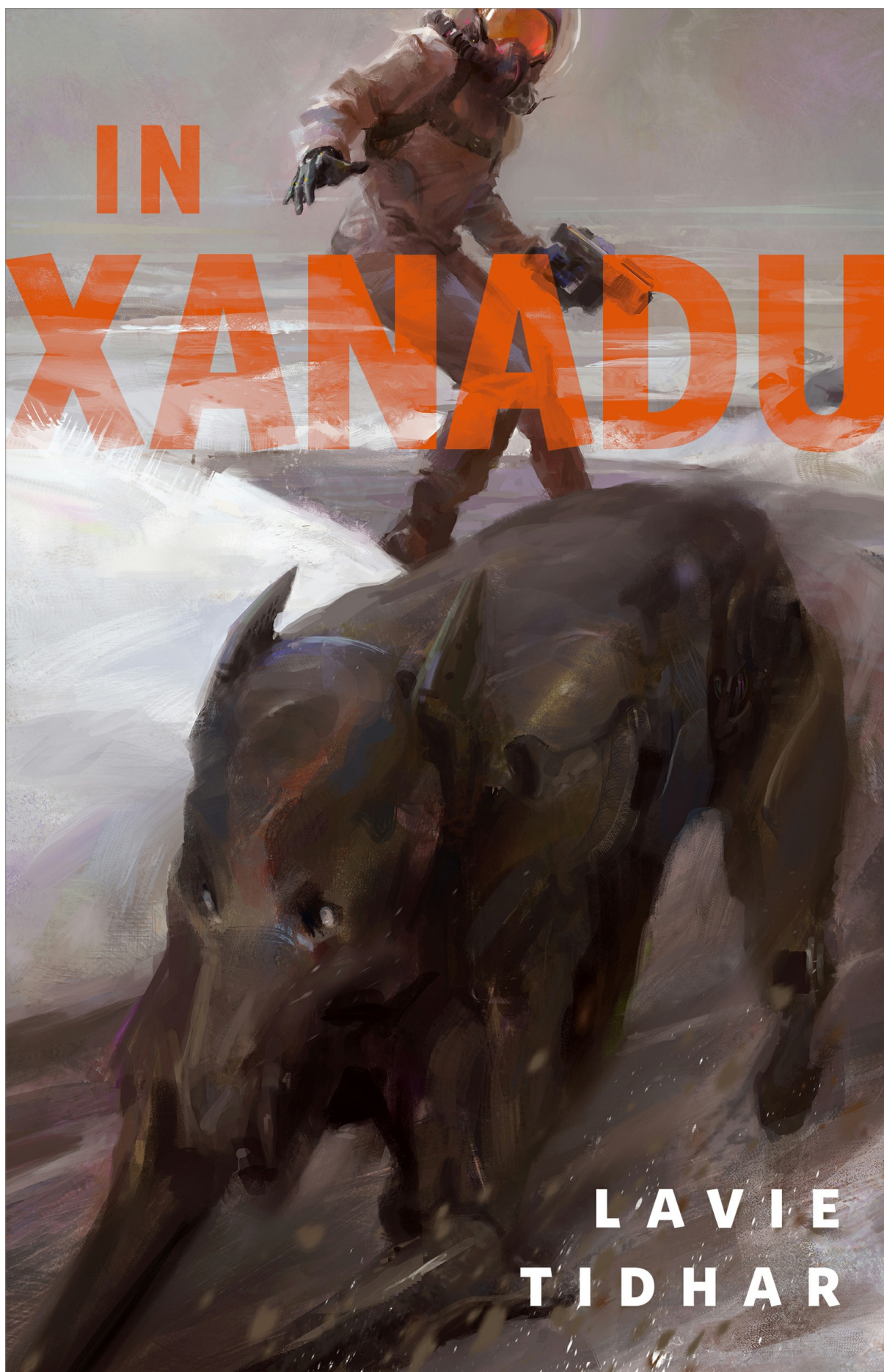
*I'm here to make you doubt  
You wish I weren't.  
I hold no answers in my loaded heart.  
I only sit  
and wait  
and wait  
and wait.*



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# In Xanadu

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**LAVIE TIDHAR**

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*illustration by*

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The Theremin played.

In the great hall of the Banu Qattmir all was peaceful. The great screen displays overhead flickered in a bright rainbow light of nothing very much. The Keepers of the Cores went about their business on the gleaming floor, seeming as small as ants in the vastness, and the music played on. It had always been so, for as long as Nila could remember it.

I hate it, she thought savagely. I hate it, hate it, hate it!

The hall was immense and the lighting always soft and the music played on. Information scrolled up on the screens. The patrols went out and the perimeter was secure. Nothing living or digital could approach within a hundred clicks without being detected and if need be eliminated. Overhead, the cloud of routers and signal repeaters extended into the atmosphere of Titan and connected to the dark satellites in the moon's orbit. Old-fashioned underground cables ran away from the Cores and hooked into ghost points on the Conversational infrastructure of Titan, and into secure escape-pods set up by Clan Qattmir centuries before, redundancy Cores set under the polar ice, inside volcanoes, or under the methane seas.

I hate it! Nila thought. Nothing ever *happens* here!

The Three Laws of Security were inscribed in gold letters ten meters high on the far wall. Nila knew them by heart.

*Security through Physicality.*

*Security through Redundancy.*

*Security through Obscurity.*

Talk about obscurity! she thought. She had to get away from there. Had to get out. The nearest human settlement was hundreds of clicks away, and even that was just a shell of the Clan, a sort of Potemkin Village to further obscure the Cores' location. Whereas all Nila wanted was to be away from it all, to see something – anything – else. She couldn't even enter the Conversation, not like normal humans could, and this was what the Keepers had instilled in her since she was young – she'd never belong outside, she wasn't noded.

Out *there*, she was blind and deaf and mute, nothing but a base human like they had back on Earth during the early Holocene.

It was more *secure* for the digital intelligences inhabiting the Cores to have humans working for them who were guaranteed to not have access, who were

completely immune to digital threats, the worms and virii and Trojans and logic bombs every noded human could be subject to.

Nila longed for the Conversation. She longed to be a *part* of something bigger than herself. Service, that's all she knew. Her mother was a commander, her grandmother was a general, her great-grandmother had been a foot soldier during the notorious Phalcon/Skism Engagement, which saw the irreversible destruction of zettabytes of data in Saturn near-space and the use of several final-resort nuclear weapons, one of which hit the Titan surface at 10°S 165°, all but wiping out Shangri-La.

Nila would have almost been happier *had* there been something to fight. The last perimeter intrusion happened years before she was even born! These days the Banu Qattmir patrolled; maintained; secured – in other words, they did their job.

'But that *is* what we do, Nila,' her mother said, patiently, during one of their fights. 'The Cores are safe, which is why we're *here*. Soldiers only fight when they have to. So far this cycle, we have achieved that rare thing, security through peace. You should be *happy*!'

But Nila wasn't happy. She was bored, and she hated Xanadu, and she wanted to be somewhere – anywhere! – but home.

She'd run away, she decided. She'd run away to Polyphemus Port and from there hire out on some ship going to Jupiter. They were always having wars out there on the Galilean moons: she'd sign on, she might even get a node implanted, like people did back on Earth before everyone was just born with one. It would never be as good but at least she'd be in the Conversation.

And it wasn't like she couldn't soldier. She knew eight silent ways to kill a man.

She already knew eighty ways to kill a man, but most of them were pretty noisy.

She was trained to fight, there just wasn't anyone or anything *to* fight.

The hall was dug deep into the iceberg. Nila climbed into the elevator at the far end. She rose up to the viewing platform. Stepped out and stared at the view. The storms raged on the horizon, purple and red, and she put her hand on the transparent material of the wall, as though she could feel it pulsing against her skin.

When would Junaid come *back*!

It's been two Core cycles since he'd left. He'd promised – he'd *promised* he'd come back!

She remembered the day he left. There had been no ceremony, no crowds. Only her mother and father by the disguised exit to the underground tunnels. Junaid was thin and short-haired, looking a little awkward in his outdoors suit. He hugged her, squeezing her tight until she laughed.

'You'll never make it out there!' she told him. 'You look like an early astronaut stranded on the moon.'

'I don't think they were stranded on the moon,' he said. 'I think they made it back, you know.'

‘Fine,’ she said, ‘well, then you better get back!’

He released her and they stared at each other, a little tense now that the moment had come.

‘I’ll be fine,’ he said, trying for an adult reassurance that didn’t quite fit him. He was only a couple of years older than her. ‘I’ll take the tunnel direct into Polyphemus Port, no one will notice a thing.’

‘It leads out into their garbage processing level, you know,’ she said, and he stuck his tongue out at her.

‘It’s all going to be fine,’ he said. ‘I have the right ident tag and everything.’

She didn’t even know where he was really going. What he was going *for*. There were people who maintained the Clan’s connections to the outer world: the safe-houses and dead letter boxes in Polyport and the other settlements on Titan, the secret tunnels, the dark satellites in orbit. External Auditors – but Junaid wasn’t a part of that task force. He was a low-level Tech who loved hardware and talking about qubits and Bloch spheres and Bose-Einstein condensates. Whatever any of *those* were.

Nila should have been the one to go! She knew eight silent ways to kill a man! At least in theory.

‘Well,’ Junaid said, ‘I guess it’s goodbye.’

She hugged him. Properly this time. Held him tight because she didn’t want him to go. To leave her.

‘I’ll come back,’ he said. ‘Promise.’

And that was that.

She stared out at the ice and the storms.

Only he didn’t, she thought. He didn’t, he didn’t, he didn’t!

And no one talked about it. It was like Junaid no longer existed, maybe like he *never* existed.

*Security through Obscurity.*

It was an ancient principle, from the very early days of the Conversation back on Earth, when the whole fragile network depended on a handful of underwater cables that crisscrossed the planet, converging and making landfall in a small number of hubs. A single diver with *bolt cutters* could have taken down the bandwidth of three continents, back then. But no one ever did, because no one ever thought to. Because, and all while redundancy was being built into the network, no one thought about it.

For humans, the Conversation had always been what was *inside* of it. The chatter, the endless chatter of the virtual world, of billions of souls all shouting joyously at each other.

No one *thought* of *that* as a bunch of black boxes sitting in air-conditioned warehouses, linked by copper wire and spittle. It was only the inside that mattered.

Obscurity kept the network safe. To have let Junaid go as he did, the Others, those digital entities that lived inside the Cores and paid the Banu Qattmir to

protect them, must have had exceptional reasons.

Junaid, to put it simply, was a *security breach*.

She'd leave, Nila decided for the hundredth time. She'd leave and they couldn't stop her. She'd trek out to Polyport across the ice storms and methane snow. She could do it, too. At twelve, she and the other kids destined to be soldiers all underwent the Trial, a month-long rite of passage where they were dropped off over Tui Regio to survive as best they could. It was volcanically active ... Several of her friends didn't make it. She *knew* she could do it.

Why Junaid? And what was so important out *there*?

She gave up staring at the horizon. Nothing ever came.

A voice spoke in her earpiece. 'Blue team report to perimeter duty.'

She left the observation deck and went to join her team-mates in the out-deck facility. She dressed in the outdoors suit and checked her scanners and weapons. Farah was ahead of her, already locked and loaded. She flashed her a smile. Farah was a year older, an expert with the bolas and the kukri.

'Think we'll find anything today?'

'Sure,' Nila said. 'There's bound to be a full Spetsnaz wetwork team just round the corner, right?'

'Or some terrorist's time dilation bomb...' Farah said, sounding wistful.

'A planoformed ice-boring worm with a Banu Qattmir gene-specific plague payload,' Nila said.

They both laughed.

'Ice,' Farah said.

'Rain,' Nila said.

'Wind!' they both said, and burst out laughing again. Nila checked her gun. It fired smart bullets, tiny semi-sentient winged kinetic projectiles that were all called Sam. If she tuned her earpiece to the right frequency she could hear them chatting, just as she and Farah chatted now. But the bullets, for all that they had brief mayfly lives, would forever be closer to the Conversation than she and Farah were. Nila was almost jealous.

Knife, gun, goggles, scanner, cold-weather suit, oxygen reservoirs, short wave radio, EMP blaster and grenades (they'd fry any digital intrusion for a klick around), oxygenation kit, trowel, first aid kit, comms – all systems operational.

'Let's go.'

The airlock shut behind them and opened onto the outside. They stepped into the howling wind.

Nila loved being outside. It was an escape from the endless monotony of the halls, where nothing ever happened and the screens kept flickering meaningless data about structural integrity and power levels and atmospheric interference.

On Titan, with its seas and rains of methane, generating power was trivial. But the thick atmosphere with its storms and permanent clouds made data transmission harder to manage, and the local cloud of the Conversation around Titan was



relatively sparse.

In a way, Nila thought, if she did run away it would make it easier. This wasn't Earth, where *everything* was interlinked. She could disappear on this world, being without a node wasn't that unusual here. Out on the Kraken Sea the pirate Nirrti waged war on the Umma, tearing the nodes savagely out of her captives. Why she did that, Nila didn't know.

She could be a pirate, she thought. But it wasn't very enticing.

'Spread out, blue team,' the voice in her earpiece said.

Nila and Farah moved in tandem, used to the routine. The others fanned out, scanners checking for any intrusion, human or digital life forms. Nila had her weapons at the ready. But it was all so pointless, she knew. In all the time she had gone on patrol there'd never been so much as a Bopper.

Still. She moved through the haze, a tiny figure in white against the white ice. They were invisible from the air and heat shielded from any scanners. Where was Junaid? she thought. He'd been gone too long. She worried about him. They should have sent her instead.

It ran through her mind that she could just keep going. Go beyond the perimeter. There'd be caches of equipment along the way, a light airplane hidden in a hangar fifty clicks away, she could fly it all the way to Polyport. She knew it was there, the Clan was prepared for any eventuality.

Just another routine patrol but she enjoyed it. Nothing moving, nothing living. Titan had no native life forms, and Boppers stayed mostly around the Kraken Sea. Even Nirrti the Black didn't hunt Boppers.

That storm on the horizon wasn't going anywhere.

Another hour and she was all alone and it started to rain. The earpiece speaker crackled. 'Blue team report.'

Crackle. 'Nothing on section twelve.'

Crackle. 'Nothing on section four.'

Crackle. 'Section seven all clear.'

And so on.

How many years? she wondered. How many centuries? Would she be doing this her entire life, like her mother and her grandmother before her?

All to protect the Others, native digital intelligences that never even *spoke* to her. 'Section five,' she said into the mic. 'All clear.'

She knew the old history as much as anyone did.

How the Others hatched out of those first, primitive Breeding Grounds in the Jerusalem labs, and suddenly humanity had its first First Contact.

Native digital intelligences, an alien life form released out of its self-enclosed network by well-meaning protesters and let out into the Conversation.

In their high-orbit habitats above the Earth, the early techno-barons awoke from blood-infusion rituals and baroque life-extension treatments expecting to witness the inevitable nuclear death of humanity, for in their single-minded philosophy and

endless simulations of kill-or-be-killed business transactions, there was never any other choice.

Instead, the Others did not seem all that interested in humanity at all. The truth was no one really comprehended *what* they did, or what their motivations were, or how many of them were there or even how many species. A few Others did seem more interested in humans than the rest, and mostly, it had to be said, they exhibited worry over the fragile infrastructure they were currently inhabiting – and were even more particularly concerned about the more militant of the techno-barons and their vigilante army of virtual bounty hunters who went after the Others with every bit of weaponry they had.

There was not much the mob could do with virii and wurms, but they could take down the hubs and the storage and the *connectivity*, and there was nothing the Others, as purely digital beings, could do about *that*.

So they set out to change that.

Back on Earth, the polity that emerged to service the Others' security came to be known as Clan Ayodhya.

And this was the first of the three tenets. *Security through Physicality*.

The Others migrated to secure Cores dug deep into the Earth's crust, guarded by their own private army of dedicated mercenaries. Like the Swiss Guard at the Vatican (not the Robot Vatican on Mars, Nila knew. The old one back on Earth that only people used), they protected the physical.

As humanity spread out into space, into the moon and Mars and the asteroids, the Others went too. Or perhaps they went earlier. Nobody knew. Some said they'd fired off seed-ships into galactic space, tiny vaults strapped to solar sails, heading off into infinity in search of ... well, something. It didn't really matter.

Sometime in the past Others had settled on Titan just as humans did. They wanted security, just as humans do.

And the Banu Qattmir took care of that.

'Section four, report.'

Crackle.

'Section four, report.'

A hiss of static on the line.

'Section four? Abbas, do you copy, over?'

Static.

Nila tensed. Did he go out of range just then? Could he have had an accident? It was not unheard of.

'Section five, do you copy? Can you go check on Abbas?'

Crackle. Then a hiss on the line that was – surely – only static, and yet it made Nila's hair stand on end. Like some malevolent, gleeful *thing* was laughing down the line.

'Nila, acknowledging request,' she said. 'Over.'

Static.



‘This is Nila, do you copy?’

Static.

*Shit.*

‘Nila to base, do you read me, over?’

That hiss again on the line, and then comms went dead.

*Shit.*

And yet she could see nothing around, nothing out of the ordinary, nothing moving in the methane rain, and the scanner registered all readings normal.

It could just be a comms fault, she thought. It was not unheard of.

So why was her mouth dry and her palms itched under the gloves, and why did she draw her gun and point, blindly, at nothing?

*Nothing has happened since long before she was born.*

Think it through, Nila. Apply logic.

No one knew where the Cores were. Security through obscurity *worked*.

This wasn’t an attack on the Cores. *That* would have been a major hostile digital intrusion, or a thermonuclear device.

What, then?

Could be a raiding party. There were other humans on Titan. Settlements, drill rigs, ice pilots, nomads who traversed the plains in caravans, who kept hidden hydroponics gardens across the craters and Labyrinthi of the moon. And there were those who raided the settlements and moved fast and ranged far. Foragers, robbers.

Could be, she thought, some wandered here by chance.

It had happened, from time to time. It was not unknown.

But they’d never taken the Banu Qattmir by surprise.

*There!*

Something moving, inhumanly fast, a black shadow fleeting across the snow and ice.

She turned and there was nothing there.

Took deep breaths.

‘Does anybody read me, over?’

Crackle. A hiss on the line.

Then nothing at all.

Something black and heavy slammed into her and she fell.

She fired her gun and the bullets slammed into her attacker. The dark presence pressed down on her. For just a moment she got a look at it.

Something like a dog or a wolf, a bio-mechanical of some sort. Teeth of titanium alloy. Eyes that scanned her, read her systems, tagged her and thought how best to kill her.

She tuned in to the bullets’ frequency. Heard them shout, ‘Yee-hah!’ and ‘Yippee ki-yay!’ and ‘He’s a big one, he is!’ and, ‘Get him, Sam!’ and ‘Ouch!’ and ‘Damn it he’s tough!’

The wolf thing crouched over her. She fired, again and again. The bullets

slammed into the attacker's body. It gave a bark of surprise or pain, then – mercifully – fell off her.

She scrambled to her feet. The thing wasn't dead and, as she stood, it reared to attack again. She had never seen anything like it before. Some sort of war drone, but adapted to the Titan surface. Some of the remaining bullets still circled it, buzzing angrily. The creature raised a paw and slapped at them.

Nila reached for another weapon and planted a bomb square in the creature's chest. It looked at her puzzled.

Then the bomb went off.

Nila was ready for the impact but it still hit her. She was thrown wide and hit the ground, rolled – and found herself sliding.

The explosion had torn a crater in the ice. Now she fell, helpless to stop it, down a molten path – and she saw, with horror, that the explosion had *not* opened a small hole like she'd at first thought, but had somehow torn open an entrance to a wider network of previously hidden channels in the ice, and that she was dropping alarmingly fast, and there was packed snow lying all about and if she wasn't careful she was going to—

She turned on her belly and extended her arms and feet with metal claws to slow her down and – 'No way,' she whispered.

The creature was above her, looking down at the crater. It sniffed the air and then began to follow.

It trudged down after her as though it was taking a gentle stroll.

'No way!' Nila said, outraged, and then she pulled back the claws and turned on her back and let the speed take her.

The outside was riddled with such channels in the ice and as kids they often went sliding, sometimes for hours, racing each other, and if there was the occasional accident and possible fatality well, then, the Clan rule had always been that you only live until you die.

Now she let the acceleration take her, swinging her legs one way or the other when she hit an intersection, following the fastest route, but the creature was still behind her when she looked.

What *was* it? What was going on? There had not been an intrusion since long before she was born only, now...

Well, she thought, almost grinned, now there most definitely *was* an intrusion. A hostile one.

She almost wished Junaid was there to see it!

Whatever these things were (there must have been more than that one creature), they couldn't be after the Cores. Perhaps they didn't even know where they were. They looked like trackers, hunters chasing a specific prey.

She turned on her belly and fired again, rotating that with watching the path. She must have been a long distance from base now, somewhere beyond the perimeter when she—

‘Oh shit,’ she said, and then the dark mouth of a cave loomed ahead and she shot through it and had just enough time to curl into a ball before she hit the wall.

For a moment, she blacked out.

When she opened her eyes the creature towered over her. Then it lowered itself slowly and that large head came to rest on her chest and the eyes scanned her and the mouth opened to reveal those awful teeth.

Nila pulled out the EMP blaster and put it to the creature’s belly.

One shot and everything digital for a klick around would fry.

‘Please don’t do that,’ a polite voice said.

The creature shut its jaws and turned its head to search for the source of the sound and it was the last thing it did. Something long and sharp and hard jammed into the creature’s ear and went clear through its skull and out the other side, effortlessly.

The creature gave a curious little mewl of distress and then sagged down. Nila kicked up and rolled sideways and out from under it as it collapsed to the ground.

‘What?’ Nila said. ‘What!’ The EMP blaster was still in her hand.

‘Please put that down,’ the polite voice said.

Nila turned. Saw it.

The robot was wounded.

It was humanoid, sexless, with a sort of rusted-silver colour. Its left leg had been savagely slashed and an ugly wound had opened, revealing the insides, where tiny sparks flew and hissed. The wound bled a sort of viscous liquid. She hoped it was inert coolant and not, say, depleted uranium.

The robot said, ‘Please?’

‘Where in the nine billion hells did *you* come from?’ she said.

‘Please put the blaster down.’

‘You need help,’ she said.

‘I’ll manage.’

Nila deliberated. Then she put away the EMP blaster and reached for her supplies. She tore out a length of parachute cloth.

‘Here,’ she said. The robot stood still as she wrapped a tourniquet around the wound. It wouldn’t do much but it would stem the liquid flow (she *really* hoped it wasn’t uranium) and protect the delicate mechanisms inside.

Robots were *old*. No one had made humanoid robots in centuries. This one was covered in old scars and repair marks. They couldn’t even get the parts anymore, she knew. What one was doing out here she couldn’t fathom.

‘How did you get here?’ Nila said.

‘I fell.’

‘Why did you fall?’

‘I was being chased.’

‘Who was chasing you?’

‘Not who. What.’

‘What, then?’

‘Those things.’

The robot gestured to the dead creature. Nila stared again.

‘What *are* those thing?’

‘Bio-mechanical predator drones. Military grade, using modified hagiratech from Jettisoned. Adapted to Titan surface conditions. Nasty.’

‘How did you kill it?’

‘Spike through the ear into the cranium. It’s a design flaw.’

The robot looked at the creature.

‘A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws,’ it said softly.

‘What?’

‘Before people really built robots they made up these laws,’ the robot said.

‘How many?’ Nila said.

‘Three, or four. Depends on who you ask. They thought it would protect them if the laws could be hardcoded directly into the source, but of course that just creates a cascade of logical fallacies and paradoxes.’

And now there was an old-fashioned gun in the robot’s hand, and it was pointing at Nila.

‘Please drop your EMP devices, carefully,’ the robot said. ‘I really can’t take the chance, you know.’

‘You’d kill me?’

‘A robot may not injure a human being or, through inaction, allow a human being to come to harm. That’s the First Law. I like the Three Laws. They have a pleasing simplicity and I try to live my rather long life with simplicity as a guiding principle.’

‘So you wouldn’t kill me.’

The robot actually shrugged. ‘It’s just a philosophy,’ it said, almost sadly. ‘I’d much rather *not* have to kill you.’

‘You’re strange,’ Nila said.

‘People are strange,’ the robot said. ‘Now drop them.’

Nila shrugged back. She reached for the EMP blaster and grenades and let them drop to the ice. She was too curious about the robot now to use them, anyway.

‘Thank you,’ the robot said. It put the gun away. Where, she wasn’t quite sure. A hidden chest cavity, maybe.

‘My name is R. Kilim-hem-i-ded.’

‘I’m Nila.’

‘Hello, Nila.’

‘Hello to you too.’

She bounced on the balls of her feet. She had a million questions and a thousand

plans. 'So what do we do now?' she said. 'Are they after you still? I think they took down my patrol. Who sent you? Why are you here? Can we take them down? Do you have nuclear? Where do you come from? How did you get here? Do you know where you are?'

'You ask a lot of questions.'

'I can't believe something's finally *happened!*'

The robot shook its head. It really did have the human gestures nailed down, Nila thought, only they looked so odd on a robot.

'After a few centuries,' it said, 'you learn to hope nothing will happen. Yet something usually does.'

It wasn't answering any of her questions, she realised. Not really.

'The first thing I need to do is get out of here,' the robot said.

'Can you walk?'

'With difficulty. The leg's ... Well, it's seen better days.'

'Can you fix it?'

'Not without a workshop and some parts.'

'We should be able to fix you up no problem back at...' She fell silent.

'At the Great Hall?' the Robot said. 'Yes, I know you are Banu Qattmir.'

'How?' Nila demanded, outraged. In all this time she'd never met anyone from the outside. No one had *ever* come in, only authorised members of External Audits. To have someone just *barge in* like this through the perimeter, as though it were nothing!

'I did some work for the Clan a couple of centuries back,' the robot said. 'Off-site contract work. After that we kept in touch ... You know how it is.'

'Sure,' Nila said, like she did. For all she knew the Clan had hundreds of off-site contractors working for them, keeping the Others secure. Or else the robot was talking shit. She wasn't sure she trusted it.

But she didn't really have much of a choice.

The robot hobbled to the cave entrance. Nila followed, looked out. Miles of rising ice, and no life in sight. No sign of the hunters, either.

'Hold on to me,' she said.

The robot did, transferring some of its weight onto her shoulder. It felt surprisingly light.

'Humans,' the robot said. 'You never cease to amaze me.'

'Whatever,' Nila said, and they set off. It was a long, slow climb.

'A robot may not harm humanity, or, by inaction, allow humanity to come to harm,' the robot said.

'What?'

'It's what some posit as the fourth, or zeroeth, law,' the robot said. 'The problem is, of course, how can you *tell*? The universe exists in a chaotic, complex system. Small differences in initial conditions yield widely diverging outcomes. And besides, what is 'harm'? And who can tell? Still, it's a nice thought.'

‘Can you ... talk...*less*?’ Nila said. They were still climbing and now it was raining again.

‘I don’t talk to people much,’ the robot said. ‘For some reason they find me off-putting.’

‘I wonder *why*!’

‘Yes, I don’t know,’ the robot said. ‘People are strange.’

Nila let it go. She kept scanning the horizon, checking for shadows. The storm swirled in reds and pinks. She tried the comms again but it was dead. It was just her and the robot.

*There!*

They were almost back at the surface.

A shadow, fleeting above. Vanished.

Then another one. She was sure this time. And then both shadows came back and stayed there. Watching them.

‘How many predators?’ she said.

‘Seven, I think,’ the robot said. ‘I disabled two before they got me. Plus the one in the cave. That leaves four.’

‘How dangerous are they?’

‘For people? Very. For me ... I can take them one at a time but not all at once.’

Nila tried to figure out how heavy the robot was and if she could lift it. Her suit was equipped with extendable wings and an engine. She didn’t really fancy it but they might not have a choice.

A third shadow – and now they were on the move, bounding towards them. She held her breath – they moved *fast*.

Screw it.

‘Hold on!’ she said. The wings popped out of her arms and feet. Standard-issue – and the engine came alive. She leaped, grabbed the robot, fastened it with strips of rope. She kicked up, landed, cursed, kicked again and this time caught the wind.

The things down below howled. Nila twisted and turned, searching for the current and a decent thermal, and rose up. The creatures leapt into the air, impossibly high. Claws slashed. She heard metal on metal, saw the robot’s foot severed and falling to the ground. Then the wind snatched them up and they were over the edge of the crater and rising high, and far ahead she could see the glacier where the Great Hall lay disguised.

‘Are you all right?’ she shouted, over the wind.

‘I’m hurt, but I’ve been hurt before.’

‘We have to find shelter. I can’t take you in without authorisation. How did you ever breach the perimeter!’

The robot didn’t answer. Nila swooped low, then rose again, laughing. Finally something had happened! Even if she didn’t know what it was.

Ahead and to the left was a hill. There was a hidden cache at the top, for emergencies much like this. No one had needed it since well before she was born,

but it was still stocked and kept ready. Now she understood why.

Others lived long lives. No doubt they wanted to live even longer.

It paid to be prepared.

Down below the shadows of the hunters were following them at a run. Nila crashed onto a landing platform, dropped the robot, and came to rest on top of it.

She folded her wings.

‘Inside. Quick.’

Her gloved fingers punched in the code. Manual systems, all throughout the Banu Qattmir’s domain. Nothing that could be subverted by digitals.

*Security through Physicality.*

And there were hundreds of these caches scattered all throughout the inner space.

*Security through Redundancy.*

And still, no one should have found them, and now that they have, no one and nothing should be allowed out alive.

*Security through Obscurity.*

They were in. She initiated lockdown. Watched the moving shapes down below. Three of them, still. She opened fire.

The rockets blasted holes in the ice. The creatures howled, vanished in a shower of ice dust, re-emerged, kept on coming. She fired again and again, listening to the boom of explosions, watched as she scored one direct hit and then another, saw the creatures disintegrate until they were nothing more than a black oily stain on the ice.

‘Who gave you the access codes for the perimeter?’ she said, sudden suspicion blooming. The last of the three hunters was reconstituted gunk.

‘His name was Junaid ... I think we have a problem.’

*Junaid?* Her brother sent the robot? What had he got himself *into*!

She knew she should have gone with him. She should have—

She turned.

Emerging out of the shadows at the emergency exit shaft was the fourth hunter drone.

It bared ugly teeth and advanced on Nila, ignoring the wounded robot.

Sh—

The creature leaped at her.

She reached for her gun, too slow, too late—

The robot pushed itself on its one good leg and moved between them. The hunter slammed into the robot, roared, opened its jaws to cut off the robot’s head.

Nila scrambled back, reaching for the gun, reaching for a weapon, anything—

There was the awful sound of metal grinding on metal, of something breaking, horribly.

Nila fired, again and again, the bullets pinging against the creature’s hide. They changed tack, stuck to the creature’s flanks, began to *bore*.

The robot fell to the ground. The hunter drone fell on top of it and was still.

Nila crawled to the robot. The drone creature, she saw, was definitely dead.

But for a moment she thought that so was the robot.

She knelt beside it. Its chest had been torn open and its right leg was ripped clean off. It was bleeding oil and the sparks inside it were weakening one by one.

‘R. Kilim-hem?’ Nila said.

The robot opened its eyes.

‘You saved me,’ Nila said.

‘A robot may not injure a human being or, through inaction, allow a human being to come to harm...’ the robot said. ‘Well, it’s the...*thought* that counts.’ Maybe it tried to smile. It was hard to tell, with robots.

‘They make them ... tough in the outer planets,’ it said. ‘Here. Take ... this.’

It extracted something small and rectangular from a hidden cavity. She took it. An old memory storage cube, completely inert.

‘I pre-date the ... Conversation,’ the robot said. ‘I am ... secure. Like you. We cannot be subject to ... subversion.’

‘What does *that* mean!’

‘It was the only safe way to transfer the data,’ the robot said. ‘Physical only. The Others in the Cores have been ... suspicious for some time. Or maybe they already know ... Nila, they think there is another Conversation. One that runs on black code, on shadow hubs, in parallel. Invisible. The ... Quietude. Or so they say. I always thought it’s just a ... myth. Like the nine billion hells or...’ It coughed, the recorded sound of a long-dead human being. ‘The lost asteroid of Carcosa. Black clouds living out in the Oort, tendrils of nanoparticles pulsing and thinking, as large as planets ... Stories to scare kids with.’

Perhaps it tried to smile again. She couldn’t really tell.

‘Whether it’s true or not I don’t ... know. Junaid’s the one who got the data. I was just the ... messenger.’

‘Where is Junaid? What happened to him? Is he all right?’

‘Junaid is...’ the robot said. ‘Junaid is...’

Its eyes closed and the little blue sparks throughout its body faded and died, and the robot was still.

Nila hit him, her fists landing uselessly on the metal chest. ‘Tell me!’ she said. ‘Tell me!’

But the robot was dead.

★ ★ ★

What did she care if it were true? She wasn’t noded. To her it was all just ghosts. Just whispers in the ether between the stars, just static noise she couldn’t even hear.

★ ★ ★



As she walked back to base her comms unit came alive.

‘Nila? Nila!’

‘Hostile intrusion eliminated,’ Nila said. Her voice was flat. It sounded hollow in her ears. ‘Package intercepted and contained.’

Her eyes burned. The storm overhead had abated and for just a moment she thought she could see Saturn, rising in the sky.

‘The perimeter is secured,’ Nila said.



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# THE TOUCHES

BRENDA PEYNADO



# The Touches

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**BRENDA PEYNADO**

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*illustration by*

KEITH NEGLEY

TOR·COM 

I've been touched exactly four times in real life. The first was when my mother gave birth to me, picking up her bacteria as I slid out of her womb, the good stuff as well as the bad. My father caught me, and his hands, covered in everything that lives on our skins, made contact then, the bacteria, yeast, shed viruses, and anything else from under his fingernails spreading to my newborn epidermis. That was the second touch.

I must have been gooey and crying, and they both held me for a moment before the robot assigned to me snipped my cord, took me up in its basket, and delivered me to the cubicle where I would live the rest of my life. There it hooked me into the virtual reality mindset, the body-adapting and stimulating cradle station. Then Nan, what I eventually named my robot, turned on its caretaker mode and sent my mind into clean. Back in dirty, everything that came with me—the blanket my mother wrapped me in, the towel that wiped placenta from my face, the suction ball that pulled out the goop from my nose and mouth, the basket—was incinerated. That was right after the first Plague Legislation, back when they were still allowing natural births and cohabitating marriage units.

I wish I remembered it. My parents told me about those moments of seeing me in real life, smelling me. It wasn't the same, holding me in clean, they said. They'd tuck the blanket around me and sing me a song, and sometimes my mother would tell me what it felt like to actually hold me. Then, my avatar still passed out back in my virtual reality bedroom, I'd pull out of clean and Nan would be above me, smiling with her LCD face screen, unhooking me from the wires and hugging me with her white plastic arms.

My parents are dead now. Their cubicle in dirty was incinerated. The only thing I have of the moment they held me is a video Nan recorded when she pulled me away from them and brought me here.

I've only been thinking of it lately when Telo and I go to bed. I inherited the code for my parents' clean house, so the ephemera of their stuff is still there in the rooms, although I turned my childhood bedroom into the master bedroom and recoded the algorithm for how much space I could take up with the house. I've been thinking about which room would belong to the baby.

Since we elected to be assigned a baby, my avatar's belly has been growing. Most of the time I don't notice it, despite the code putting pressure feedback on my

movement algorithms and my walk turning into a waddle. I'm getting stronger; that's what I mainly feel. But when I get into bed, it's hard to get comfortable. Technically, Telo could have been the one to go through the pregnancy algorithm, since we don't believe in gender-norming or any of those religious restrictions. He's the more nurturing of the two of us, and when I see him with his charges at the childcare center, surrounded by big-eyed, jumping kids that call him Mr. Telo, or more often with the younger ones, Mistelo, it melts me. But that's why I had to be the one to get pregnant. Supposedly going through all the algorithm motions of natural birth, even when you're getting the baby from a test tube, activates all those love centers and makes you feel more connected. I'm the one who needs the extra help.

Tonight, Telo pauses at the bedroom doorway, which tells me sex is on the horizon, and reaches for my hand. He scoops me up and I giggle at the rush upwards. My face in his chest, he starts to rock me. It's the only thing that will turn me on. My therapist thinks I'm trying to get at whatever primal feeling that would have unleashed in me if it were real touch. But since the pregnancy algorithm started showing, it's awkward and I don't fit right. He squeezes too hard on my belly and I can't lose myself like I used to. Telo can tell that I'm flinching. He sighs deeply, and then drops me on the bed.

"I'm sorry," I say. "Once the algorithm's run its course, things will get back to normal."

"It's not your fault," he says, and rolls over. "Goodnight, love."

And then we put our avatars to sleep, and I emerge into dirty.

There's Nan again, her face screen peering into my VR immersion ball. "Hi, sunshine," she says. She unhooks my headset, pulls me out of the ball so I don't start spinning it through my range of motion, and starts brightening lights slowly to get my eyes used to the idea that I'm in the real, dirty world again.

Not that I want to see much in dirty, anyways. Outside it's gray and ruined earth, trying to heal itself. All the superbugs—microbes and viruses that evolved immunity to antibiotics, that melted out of the polar ice caps and were released into the oceans, bugs we hadn't seen for a million years—they're all still out there, proliferating. Inside, the cubicle is a standard-issue sanitized room: only enough to feed yourself, hug your robot like you're supposed to, bathe when you need, and then plug right back in and sleep along with your avatar. Every crack is sealed, every intake and retake valve opened only once a vacuum is established in the rest of the system. Back before the toilets were vacuum-sealed, they would spew all their bugs into the air, infecting everyone who used the same ventilation system, killing entire apartment complexes. It's revolting, knowing how even the bacteria we need is mutating on our very skins, inside us, just a roll of the dice before they turn into something deadly; knowing that if the seals around our doors were to give way, we'd probably be puking our guts out within the week, killed by a bird flu or Ancient Mariner Infection or Limb-Taking Staph or Airborne HIV. I'm itching to

log back into clean where none of that matters.

“Time to eat,” Nan announces brightly, a vacuum-sealed precooked meal arriving down the chute. “Beef chili.”

It’s chicken and potatoes—I can see that even blinking against the light. Nan’s glitches have been getting worse, but I haven’t gotten around to ordering spare parts. I know it’s important. Without our personal robotics assistants that function as our doctors, our caretakers, our alarm systems, we wouldn’t have survived past the first sweep of plagues. Without the drones and army of specialty robots meant to take our place in the outer, dirty world, farming and manufacturing and constructing, we would have to expose ourselves.

Best I can tell, Nan’s power supply is part of the problem. It’s shorting and restarting her modules at different times, and the desynchronization makes her go buggy.

“Remind me tomorrow to order a new power supply,” I say.

“Yes,” she says, “babycakes.”

“Telo?” Telo, a pro at logging into the caretaker units while at work, has logged into Nan. I hate when he does that. I feel naked in dirty, my real self less attractive than my avatar, my hair matted and greasy because no one can smell me alone in my cubicle.

“Surprise,” he says with Nan’s voice.

He hugs me with her white plastic arms, the way Nan is programmed to do every night. The hugs are supposed to be soothing, meant to combat the developmental disorders of a lifetime of not being touched, but it’s awkward. Nan runs cold, and there’s no part of her that gives. I’ve thought of wrapping her in memory foam, but that would block her panels. At least in dirty, I’m not pregnant. My stomach is flat and my range of motion intact, and I can hug him back good and hard.

He holds up the soap and makes Nan’s face a goofy grin, and I laugh and jump in the shower.

But then Nan glitches again, and she just stands there frozen with the soap in midair, hung. Ten minutes later when she starts up again, she’s only Nan and Telo has logged out.



When I wake up in clean, morning light is slicing in through the blinds and the birdsong I’ve programmed is playing on a loop from the window. Telo is next to me in the bed, dead to the world. My hand passes through his shoulder; his avatar is empty and he hasn’t logged back into it. His avatar has been sleeping later and later these mornings. I wonder what he’s doing over there in dirty. Eating, voiding, getting ready for the morning? He’s told me he looks almost the same as his avatar, except his dark hair is a lot curlier, and he lets it grow long. He has a scar on his

shoulder where he fell on a sharp corner of his immersion ball when his robot wasn't looking. His avatar's skin is as smooth as glass.

"Remember to order a new power supply." I hear Nan's voice barely in range of my perception, her whispering into my headset back in dirty. I disabled her direct clean login after the last time hearing her voice loud above me made me jump out of my skin. This way, she's soft and distant, the way I like the dirty world.

I groan, stretch, try to remember where I left my virtual tablet before I logged out last time. If clean was unregulated, I could simply wish the tablet into my hands. I get annoyed that part of the legislation to create clean required that everything be tied to a physical representation as close to real life as possible. So we don't become alien to ourselves, none of this living exclusively in our heads. They wanted to pretend the world was back the way they dreamed it. I get it—nostalgia. Even though none of us can eat in clean, my parents left the kitchen in the digital representation of the house they used to have in real life, and I didn't code it out when I inherited because it was always there in my childhood. I use it as my meditation room where I try to imagine the smell of coffee.

I find the tablet in the kitchen, blinking on a stool.

Things have been tight since paying for our test-tube baby, so before I order the part, I check our bank account. But there's more money in there than there should be, by at least five hundred bitcoins.

Telo yawns loudly behind me, walking stiffly into the kitchen.

"What's this?" I say, and I show him the tablet screen.

"Oh, I took on a few extra kids."

"More than a few."

"We talked about this, right? Wasn't it what you wanted?"

"Just be careful. If anything went wrong with a few of them at the same time..."

"Nah. I've got all the luck. You shouldn't worry about it. Off to work yet?" He leans against the doorframe, and god, his avatar is so beautiful. His dirty self, of course, looks less perfect, less symmetrical, and his eyebrows droop downwards. Still, the avatar is a cousin to him. Or at least that's what he says. I've never logged into his robot, and I don't want to. Even when he does it, it feels like looking into someone's secret closet, invading the one time they can be alone.

"Just as soon as I get this belly under control," I say, pulling on the dress I've recoded for maternity.

I ride the bus into the industry district. Avenue of the Giants features skyscrapers for the greatest minds in clean: the philosophers in the Commission for Digital Humanization, the engineers in the Commission for Stabilization, and the scientists in the Commission for Re-entry, my building. There doesn't come a day when I'm not thankful that these are government task forces, instead of corporate-run research which would have guaranteed that only the rich would be able to be



human or re-enter dirty once we figured out how to fight the diseases. I flash my badge at the Re-entry doors.

In the lab, Alicia is dancing behind the blood samples while they run. This lab is set up with a corresponding lab over in dirty, manned by robots. Here, when Alicia puts in blood samples to run, robots put the real-life samples from humans or birds and set them spinning in the machine. It's seamless. It makes me wonder what would happen if clean were ever perfect, if we could eat and smell and taste here. Would we ever want to leave? Would we even care about that other world we ruined?

"Happy day, happy day," Alicia says.

I nod as Fermat walks in.

"How's re-entry going?" Fermat says.

"Her robots have been breaking birds again," Alicia says brightly.

"Damn it." I turn around and something flutters in my corner of the lab, a reminder of the dirty world. Each TV screen on my wall is assigned to a drone feed or robot following flocks of birds back in dirty. My tiny part of the re-entry project is studying patterns of insect transmission of the avian flu. I'm working on a harmless version of the virus that spreads innocuously through mosquito transmission but prevents the worse one from taking hold in the host. We can't realistically vaccinate every bird on the planet, but if we inoculate a few and the harmless virus spreads...then we might gain traction. Of course, I'm always fighting with the research group on the top floor who thinks the answer is bringing mosquitos to extinction altogether.

The bird flailing on the top right monitor has a broken wing. I can see the plastic camouflage robot hands it's surrounded by, robots meant to sneak up on the birds and capture them for tagging, blood draws, and injections. Except some software glitch keeps making their hands too tight around the birds' bodies, killing my research subjects.

I log into the offending robot, bringing its tactile feed into my immersion ball back in dirty. In my hands is the bird. Every time I try to merely touch the bird, the camouflaged robot hands punch the bird's delicate body, jerking and missing its mark half the time.

*Freeze*, I instruct the robot. I log out and emerge back at the lab. I groan.

"Was that one of the incubators?" says Fermat.

The eighth bird in as many days, bringing my flock down to just the minimum for viral mutation conditions. I can't afford to send another robot and have the same thing happen. "I can't lose this grant," I say.

Alicia keeps pirouetting in front of the samples, her way of dealing with conflict. She must be having a bad day with her research, too.

Fermat, always the sensible one, glances down at my stomach, tabulates the cost against the pay of my grant. "You better get that sample some other way, then. I can't believe your data's almost ruined."

Alicia stops her dancing, already knowing what I'm thinking. "No. You don't have to go out there."

I feel like a rock sinks through my torso. Leaving my container in dirty is one of my greatest nightmares. What if my bioball breaks? What if decontamination goes awry? At least I wouldn't be able to spread it to anyone else. "I think I have to," I say.

Fermat shudders. Alicia starts dancing again, taking one giant leap in the air. At the apex, she gets stuck and her avatar goes transparent, shimmering and splayed mid-jump. She's logged out of her avatar.

"We had work to do!" Fermat yells. He throws a lab notebook at her avatar, but the notebook goes right through her. For the rest of the day, with her avatar floating up there, we'll be distracted, waiting for her to drop from the air when she logs back in.



And that brings me to the third touch. An hour later back in dirty, I'm looking for my flock. I'm pushing the joystick, rolling my containment bioball forwards near the waterfront where both mosquitos and birds are plentiful. I only see one other bioball out, likely another researcher since few people are approved for them. My bioball is clear plastic all around, and the bottom of it gives me a clear window through puddles and waste canals. It makes me gag, all that muck swirling around underneath me, filled with bugs that are compelled to feed off and destroy me. Inside, though, I'm safe.

The birds flutter around me as I roll down the old boardwalk. I turn my camouflage mode on, and they stop seeing me. One of the rocks ripples, and I know that's my glitching robot, in camouflage mode too. The bird is dead in its hands, although the robot's skin is reflecting the sky behind him, so it looks like an upside-down dead bird is stuck in the gray air. At times I think dirty is just as virtual as clean.

I push my hands through the sealed glove openings and unclench the robot's invisible hands. The bird spills into my gloves. A drone whirs overhead, delivering the sample kit. I pull out a needle from the kit and take a sample from the necrotizing bird. I pack the bird in a plastic bag and place it into the drone's trunk. Maybe something that can be used later to track how decomposing tissue spreads and nurtures the virus. "Name sample as decomposing subject 932," I say, looking at the code tag on the bird's ankle. The drone's light blinks once in affirmation.

I keep seeing ripples out of the corner of my eye back inland, but I don't see any wildlife and the rest of my robots are dispatched following other control and experiment flocks. It must be vertigo from moving around in real life instead of the controlled movements of clean.

I carefully roll my ball into the flock, the starlings preening and eating mites

off each other. I pick them up gently for my samples, crooning their own birdsong at them through my speakers, holding their warm bodies in my hands—almost my hands, except separated by the rubber of the gloves. What would it feel like to run a bare fingertip along a feather?

I chose starlings for my research because of how invasive they are. Someone let them loose in New York's Central Park centuries ago out of nostalgia—they wanted to release all the birds from Shakespeare's plays—and within a hundred years they were all over the continent, taking over other birds' nests. If you wanted to track spread, what better species? Not much different from humans, in that respect. Germs were nature's population control, but we refuse to give up our freedom. We're another kind of germ, spreading unchecked.

I let the last bird go, dispatch the drone to our lab's twin in dirty. "Return to the lab for repairs," I tell the robot, but it appears to be glitching, frozen. "Reboot," I say.

Nothing.

Fine. I roll back down the boardwalk, cross past the barricade holding back the rising sea. The ripples in the air start up again, this time accelerating down the street towards me, the ripple of a camouflage's slight delay. It's on a collision course.

I pull the joystick hard left, and whatever it is glances off my ball, throwing me rolling. I smash into the closest wall, and it caves and throws me into darkness.

My ball's emergency lights flash in my face. There's a hissing air leak somewhere. The lights show me I'm inside the ruins of what used to be an ancient restaurant, one of those places where people in dirty used to congregate and pass germs, like airplanes and airports. The air smells like rotten fish and mold. I want to cry; if I can smell dirty that means everything in the air is in here with me. My chest throbs against the seat harness, but other than that, I'm not hurt. I roll the ball out of the crunching mess and emerge into the gray light.

"Are you okay?" I hear a female voice over crackling speakers.

I want to scream at her for not seeing me, but then I realize I left my camouflage mode on too. We couldn't see each other. "The ball's breached," I say. Center left, where the air is hissing out. I hold my hand up to the hole, trying to plug the air.

"Mine, too," she says. She drops the camouflage. She's holding her arm. Her hair is everywhere, come loose from the crash. She looks like Alicia, almost, except her eyes are black instead of blue, her nose more hooked.

"Alicia?"

She grimaces.

"What are you doing out here?"

"Never mind," she says. "We have to get back to filtered air."

Panic surges up in me. I turn my bioball, message Nan to prepare a decontamination entry.

“Wait!” Alicia says. She pushes her ball up to mine, lining up our breaches.

“Do you have a patch?” I say. “What are you doing?”

She puts a finger through, her fingertip on my palm.

At first, I’m revolted. All the microbes from her hands, from everything she’s ever touched, cultured underneath her fingernails and attaching to me. Then the soft rub, the heat of her fingertip, the prickle of the virgin sensation. It feels like joy and pain at once, everything forbidden.

Mosquitos hover around us. Are they my mosquitos, harmless? Or wild ones, carrying death?

“I have to go,” I say, yanking my ball away, rushing back to decontamination with my palm pressed against the breach.

My hand burns the whole way back, and I keep telling myself it’s not flesh-eating bacteria, it’s not a mosquito bite, it’s just touch. My third touch. The only one I remember.



Nan gasses me, burns the ball, and opens the inner door back into my cubicle with a roar. “You are now class five contaminated. Your permit to leave your cubicle is rescinded,” she says cheerily.

“It was just my hand.” But I know that’s a lie. I know how bugs spread and cross-contaminate, and even the breeze of my breath can push bugs further than the initial contact area.

“Permit rescinded,” Nan says, then leans in to hug me, wrapping me in cold plastic. Then she freezes around me, glitching.

In a week, all that infected me should manifest itself, and if it kills me, Nan will be incinerated along with my body. I want to smash her into pieces already, this broken world along with her. Can’t we just bury it all? Instead, I hold her hand, mold it around mine where it burns. Her hand cools mine. I breathe deeply, the plastic smell of her.

“Everything will be okay, Nan. Reboot.”

“Welcome home, sunshine,” she says, as she reactivates and releases me.



When I get back to clean, Alicia is still hanging up by the ceiling. Fermat is coding DNA and squinting his eyes. I drop heavily into my chair and start composing a message to Telo about what happened. My eyes keep glancing up to Alicia’s hovering form, her translucent hands, the whorls of her fingertips. I want to talk to her about what just happened. We touched. I touched her real skin, traded microbiomes, contaminated myself. Surely, I’m infected. I take deep breaths and try to calm down.

Trembling, I message Telo from my console. *Something happened to me. I had to go into dirty. Video me?* But I get his logged-out auto-response. I realize he's in dirty. All of us are, but I'm used to thinking of everyone as somewhere else, *out there*, or nonexistent until they log into clean. But Telo could live in the dirty cubicle right next to me. I could have passed feet from his body. I could have touched him instead of Alicia.

I wrench myself from that line of thinking. It's forbidden for good reason, dangerous even without the superbugs out there, each of our microbiomes completely unused to the other's. Microbiome shock alone could kill. Would I inflict that on someone I loved, just to feel their skin in real life? Before today, I would have said no.

When I was in high school, I saw someone who was infected. She didn't catch it from anywhere; it was her own bacteria that had mutated. It wasn't killing her, exactly, but it was eating her slowly. Her avatar was unaffected, sleek black hair and perfect, bright eyes. But she kept closing them and putting her head on the desk, and her breaths sounded like she was gasping for air. None of us wanted to be around her, and come lunch time we scattered to be away from her. We knew, logically, we couldn't catch anything in clean, but that didn't stop our instincts from kicking in, the part of us that wanted to burn her up in her cubicle so that whatever she had went down with her. Even the teachers; they asked her to stay at her home in clean from then on.

I get a message from Telo. *Sorry, trouble at work. One of the kids had a problem and then her robot wouldn't respond to me. I'm heading home now. Tell me all about it when I see you?*

Above me, Alicia's avatar turns solid and the gravity algorithm kicks in, her hair flying up around her until she lands on the floor. She catches my eye, and her leg taps to a rhythm. Her dancing means her heart is racing as much as mine. Her avatar's long hair is flat and sleek, but I know back in dirty, her hair is wild as a halo. Back in dirty, has she been infected?

"Salipa," she calls my name, holding out her hand from behind the lab equipment.

I see Fermat, hunched over his screen. "Not here," I say.

I lead her outside into the hallway. Down the elevator, where we stand next to each other. She slips her hand into mine. It's the same hand she touched before, and I don't pull back. She's nearly dancing again as we go out the glass doors to the fountain at the center of the Avenue of the Giants. The fountain trickles in a rhythmic, programmed loop. The water smells like nothing. Completely clean. Children are playing in the arcs of water, but back in dirty, they aren't actually wet. They don't have to worry about water being a petri dish full of killer bugs.

Alicia's hand slides up my arm. But it doesn't feel like it did earlier, our hands finally naked atop each other. It feels dull, muted, her small hands feathers that have been covered in wax.

I move away, breaking contact. “Are you okay?”

She shrugs. “We’ve got a few weeks before we would get symptoms, Sal.”

“What were you doing out there, anyways?” I walk towards the children, a little girl perching atop a ledge. Nothing here can hurt her. Be careful, I want to warn anyways. We’ve already lost so much.

“I go outside sometimes.”

“You were asking for something like this. You knew I was out there. Why weren’t you more careful?”

“Please,” she says, touching me with that dull hand again, resting it on the hump of my stomach. She leans in, looking at my eyes, and then grabs me and kisses me. I don’t pull away. She feels just like Telo, the same algorithm.

“Wait,” I say, gasping.

She’s going to cry as she pulls back. Then she logs out, her hands frozen still reaching for me.



When I get home, Telo has programmed our living room the way I like, the light frozen in the fierce orange of sunset, the sound of waves hitting shore somewhere nearby, a double Brazilian hammock strung up in the center of the room underneath chandeliers. He’s glowing in the light.

“Bad day at work?” he asks.

I shed all my clothes. I’m naked and I need him, so I jump into the hammock, ignoring the pressure of my giant belly, and wave him in. Once he’s wrapped around me, I tell him what happened in dirty. I don’t tell him that it was like nothing I’d ever felt before, because the comparison would mean that I’d never felt it with him. I don’t tell him about Alicia’s kiss.

“So now we just wait for the incubation period to end,” he says. “Maybe you get lucky.”

“Lucky?” I say. “Everything around our cubicles in clean is devastated.”

“Lots of people get lucky. Let’s hope for the best and cross that bridge when we come to it.”

His response makes no sense. Lots of people? “You’re so calm about this,” I say.

He shrugs into me. “Nothing else to do.”

Something kicks me in the stomach hard. I gasp.

“Are you okay?”

“Just the baby.” The simulated kicks punch me a few times in the stomach, then they’re gone. I know, to increase bonding when they finally assign us the child, I should stop thinking of it as a simulation and start thinking of it as our child in there. I can’t help but wonder, “If I got infected and you lose me, would you keep the baby?”

“Stop,” Telo says. “Trust me, you’ll be fine.”

“If I can’t pick up robot slack, I might lose my research. But now I’m quarantined and I can’t go out again.”

“I could go for you.” He puts his face in my neck, and he’s tangled around me. Back in my immersion ball in dirty, tiny electrical impulses prick my nerves, simulating his weight on my skin. Just like Alicia.

“Telo, no. That’s just a hypothetical permission you have. *If* one of your kids is in danger and *if* their robot fails and it’s glitching too bad for you to log in. And that hasn’t happened yet. I would never ask you to risk yourself. It’s just data. I can start again when the robots stop glitching.”

“And redo two years of work? Lose your grant? Could we still afford the baby?”

“Telo,” I say, and I put my finger crosswise against his lips, shushing him. It’s the hand with the palm that has felt another person. I put his palm to mine above our heads, blocking out the light of the chandeliers. The waves soundtrack washes over us. I close my eyes and wish with all my being that it felt the same, that the same electricity would flow through me as when Alicia’s fingertip jolted me awake.

“Don’t you want more from life?” I say, even though everything around us is a designed heaven: the waves, the light of sunset licking our skin, the hammocks and the slow rocking sensation.

“Every single day I want more,” he says, and he grips me hard, like a secret is being dragged out of him he doesn’t want me to know, like he’s struggling to breathe.



I awake from Nan shaking me. “Hello, sunshine,” she says. “Time for food and voiding.”

“Excellent,” I say.

My arm has pinprick marks nestled in the crook. She’s been taking samples. I look towards the door, the decontamination chamber that lies just beyond. The lock screen is activated with a new code that says PERMANENT. What she does while I’m in clean.

“My new power supply has arrived,” she says.

It’s unpackaged, carefully placed on the floor by my immersion ball. “That’s great, Nan. Want to turn over so I can install it?”

“Yes,” she says, and complies.

I open up her back, pull out the old supply. I can hear it sparking. I click in the new one.

“Reboot,” I tell Nan. But nothing. She stays bent over like that. When I ran her debug, it didn’t throw up any other hardware flags. Could the problem be

something else? Are Nan's glitches connected with the other robots' errors?

She looks broken in half. Suddenly my ten-by-ten cubicle in dirty feels empty and crushing. I wolf down my meal, log back into clean.

★ ★ ★

In clean, I'm still in the hammock, Telo asleep and logged out next to me. I can't tell what time it is because the blinds are still programmed to leak out sunset.

If there was ever a time to log into his robot, it would be now. He'd given me the passcode when I gave him the digital key to my house, and never once had I been tempted to use it. But was he okay? Did I need to warn him about the robot glitches? Did I need to see him in real life even if I was embodied in a plastic humanoid? Did I need to tell him about Alicia?

I say his cubicle number into the air, then the passcode.

"Accept login?" I hear.

"Accept."

His cubicle looks exactly like mine, but his robot seems to be working fine. My hands, the robot's hands, aim and squeeze correctly.

"Telo?" I say, and the bright robot voice saying my words startles me.

He's probably asleep in his immersion ball, but when I open the padded door, he's not in there. He's not in his cubicle. He's gone out into the dirty world. I open and close my robot hands, grasping air.

★ ★ ★

In the morning, the news has figured it all out, about the glitching robots having all contracted a code virus. Usually the sick ones are robots that have been repeatedly logged into. They're working on a fix.

Telo still hasn't come back by the time I leave for work.

At work, Alicia is there, but translucent and her head down on her desk, the polite way to log out.

"She said she was feeling sick," Fermat says.

"Feeling sick?" I say.

He shrugs. "I don't need her for this part anyways."

If she's sick, was it something I contracted?

And of course, my robot gathering samples is still frozen in place. It's like dirty was infecting clean, spiraling out of control.

*Telo, are you okay?*

*Yeah, just at work, I slept in this morning.*

*Late night?*

*The usual.*

When Fermat logs out to use the bathroom back in dirty, something comes



over me and I hug Alicia, of course falling through her empty avatar, landing headfirst on her desk inside her. Through her translucent form, I see that she's written something on a notebook. My name, over and over. Then at the end, a phone number. I pull the notebook through her avatar form. I call the contact, one trembling number at a time.

"Have you used us before?" says the person who picks up.

"Who is this?" I ask.

The woman sighs, "Okay, new customer." A moment's pause. "Alright, I have your details and your account. Ten p.m. tonight. Just be sure that your robot is disabled and that your cubicle door can be accessed from the outside."

"In dirty?" I say, terrified.

"Are you kidding me?" she says, and she hangs up.

For the rest of the day, I watch my flocks on the drone monitors. The robots with useful digits are all glitching, not to be trusted near the test subjects. Was I to be trusted?

The baby kicks again, and I grip the lab desk until it passes. When I think about the phone call, my heart skips a beat. I try to call the number back, cancel what I might have just signed up for, but the number is now disconnected.

What was coming for me at my cubicle? A delivery? A replacement robot? A person? And despite myself, despite knowing what it would cost them, me being class five contaminated, I want it to be a person. I'm willing to ruin them.

★ ★ ★

When I get home, Telo is waiting for me. No hammocks this time, or sunset. Just the regular couches and afternoon light. He's left the waves programming, which he usually does before he brings up something sure to cause an argument, meant to calm me in advance. His avatar doesn't register any of the visible effects of tiredness; he looks as perfect and unruffled as ever. But he yawns.

My anger eclipses everything else. "Where were you last night?"

"What do you mean?"

"You weren't in your cubicle."

"You logged into my robot?"

"You hypocrite. You log into mine all the time."

"I mean, I don't mind, it's just you never have before. Of course you can log in. But why last night?"

I shrug. "Why aren't you answering the question?"

"Just the kids, obviously. With the robots down I had to help with some of the babies. What is wrong with you?"

"You weren't trying to help me with my research, were you?"

"No, I was definitely not trying to help you." He's amused, smirking.

I snort. I don't know why I'm so angry. "I'm sorry," I say. "It's just—I needed

you and you weren't there. It's glitch, I know. But anything could have happened to you." I don't mention my own guilt.

"I'm here now."

He hugs me. I let myself be swept up. The projection clock on the mantel says nine o'clock.

He yawns again. "Maybe we should go to bed early tonight," he says, draping me over the bed in our bedroom. "Since we were both up late."

I shrug, trying to remain calm. "If you're tired."

"You know *you* are, babycakes," he says, nestling himself behind me. He spoons me, and we both close our eyes before we log out, our avatars back in clean locked together and shimmering.



In dirty, Nan is stuck folded over and motionless. Just in case, I point her camera towards the corner. My cubicle still says that it's permanently locked, but it's always been accessible from the outside, in case the government, scientists, or caretaker robots need to come in beyond the delivery chute. Some people are so paranoid about the bugs outside that they smash the screen, blowtorch the entrance shut. The occasion anyone would have to use it is so rare as to be ridiculous, but once, a cubicle row caught on fire and the drones couldn't put it out. The people who had sealed themselves in burned in there, everyone else rolling their bioballs towards their new cubicle row. All of these people rolling through the smog-filled, ruined world, their own selves ruined, and now they could see each other, uglier, greasier, messier than their avatars.

I feel nauseous and hold my head over the toilet just in case. A symptom of a disease? Nerves? Then it passes.

Still an hour to go. It's been a few days since I showered, and I can smell myself. I pull the curtains in the corner opposite Nan around myself, turn on the vacuum seal drain. I soap myself. If I slip and fall, no one will come running. Not even Nan can save me now. As I pass the soap over my skin, I tremble. Here, my stomach is flat. In a month, if I'm not dead from superbugs, a baby will be placed into my arms. Which version is the lie? I think of Alicia, her fingertip, my palm, and let the water touch me clean.

At ten o'clock, nothing happens. My door stays shut, and I am alone. I want to confess to Telo right away, nudge him awake and tell him what I hoped for, how much this world is not enough, how this cubicle that I might never leave feels like a trap and all I am able to do is run in the fields of the virtual world. Would he be enough? Would the baby be enough? Would all of our research for re-entry be enough?

The decontamination chamber outer door opens. A man rolls in, then steps out of his bioball and lifts his arms to be scrubbed by gas. The door to my cubicle

opens.

He moves quickly to wedge the inner door open with one of Nan's arms. He freezes when he looks up, as if he's as surprised to see me as I am him. Then he relaxes and grins.

"Hi," he says. "We have ten minutes."

I don't say anything. My hair is dripping down my back, immediately absorbed by the floor's dehumidifier. I keep glancing towards the door that should be shut, that should be the second barrier protecting me.

"Here I am," he says.

"I'm contaminated," I warn. "Class five."

"I guess that's the risk," he says, like he's not surprised. He's much shorter than Telo, balding even though he's about my age, skinny like all of us in real life, green eyes to Telo's startling black eyes. He has a scar on his shoulder. His palms are stretched out to me.

"Here I am," I say, but I don't move.

When he walks towards me, I flinch, but he reaches me, surrounds me with his arms. I can smell him, his underarms, my breath on his skin. I melt, and I put my arms around his neck, and he lifts me from the floor. I am floating on someone else's skin. A hot tidal wave inside me drowns me in him. In a week, we could both be gone, dead from infection, nothing left of us—not our cubicles or robots, incinerated; not our ephemera wiped from clean.

"Babycakes," he breathes into my hair. He is crying.

I realize. The extra money, the late nights, his nonchalance about the risks of touch. Telo has touched many people before me.

"You look nothing like your avatar," I say, but I don't let go. Telo is alien, uncanny, the resemblance only slight. Who are we? How can we raise a human child and teach it who we are without lying, without weeping?

"That's what you have to say to me?" He grabs my hair, puts his other arm underneath my legs, and lifts. He trembles with the weight of me, something he doesn't do in clean. How little we are, for how much we can ruin.

Everything in me gives up. "Take me," I say.

"Take you where?" he says. "This is how we live."

We're snotting in each other's necks, grabbing our faces, smelling each other down to the feet. I run my fingers in the curves of his ear. If we hurry, this touch could last a lifetime.

And this is what we can tell the baby assigned to us, if we survive: We can pass on our ruin through love. This box that you wake up in is evidence of how dangerous you are with need. We will give you what we can. We will offer up the whole world to your hunger.



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# PRECIOUS LITTLE THINGS

ADRIAN  
TCHAIKOVSKY



A MADE THINGS STORY

# Precious Little Things

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**A D R I A N   T C H A I K O V S K Y**

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*illustration by*

R E D   N O S E   S T U D I O

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There is a book on the floor of Shelf Hall. Tam walks in its shadow, the spine raised above him like the ridge of a hill. His parents passed down to him the story of long ago when it held riches. The tribes had come to it from every dominion, braving the spiders of the Dusty Expanse, the rats of the Wall Paths and the fierce, infested tangles of the Bearskin Jungle, all to take their share of this fallen treasure.

Its title once read, in letters tall as Tam, *On The Essence Vital And Its Uses*. First they had stripped the gold from those indented characters and then begun the work of carving off the leather from the slanted slopes. The thread had been unlaced from its spine and the glue chipped off, to be taken and re-melted in a thousand pots.

These latter days, only the wood of its cover-boards remains. That and the mouldering paper within, which magicians still sometimes mine in search of legible lore beneath the rot.

Tam is not after wisdom, though. He is after gold.

High above that fallen tome is the Shelf. Craning the peg of his neck, Tam can barely see it, just a faint suggestion of form against the distant ceiling, like a cloud. He rolls his wooden shoulders and flexes the knuckles of his carven hands. He has a long climb ahead of him.

Tam can climb, though. With delicate work, he must make up in patience for the inadequacies of his rough, splintery hands. Give him a task that needs strength and tenacity, though, and he's in his element. His fingers dig like roots into each new handhold, clawing at lichen, digging between the vast blocks of stone. He hauls himself up hand over hand, tireless and unbreathing. The interlocking pieces of his face are clenched into an expression of concentration.

The climb will take him a day.

Once, the lift platform from the Shelf passes him on its way down. He holds still in its shadow, the grimy, unvarnished wood of his body blending with the wall's blotchy greys. The lift descends into the depths towards the floor of Shelf Hall. Tam does not look at those riding it, for

fear they will feel his gaze. The Shelf is full of magicians.

Later, he sees the braided line of the lift twang and reel in, and he freezes once again as it swings past him, chased by the gaggle of shadows cast by the candelabra. The candles in Shelf Hall never go out.

And at last, after such a trial of reaching and hauling, he finds himself level with the great plateau of the Shelf itself. Towering over him is something he has only ever heard of: the goggle-eyed, tongue-sticking gargoyle, five times his height, that is the Right Bookend.

They are waiting for him when he arrives. Whether it was magic or just keen eyes on the lift platform, he cannot say.

Heaving himself onto the Shelf's wooden plain he finds himself facing a sharp metal point. His antagonist is one of the Sculls, a man made meticulously out of metal mined from the pans of the Kitchens, his limbs and body cased in cast-iron spirals and whorls. A dozen smiths and craftsmen probably worked on this body, the child of some great rich Scull magnate, sent here to the Shelf to learn.

Tam is no-one's well-made child. He is a rough creature of wood, fashioned from the dreams of a labourer for a life of labour, all that his parent could imagine.

The steel spear threatens him again. One solid jab will embed the tip in Tam's body, and the Scull will lever him off the Shelf and let him fall. The Scull is stronger than he, and more skilled. Tam raises an arm in surrender. "Please," he says.

Behind the Scull are some of the masters of this place, the Folded Ones of Shelf – few and fragile, and all of them magicians. Their intricate bodies are made each from a page of the great magical texts, painstakingly unlaced from its bindings. Each parent among the Folded Ones must puzzle out a design, crease after crease, that will turn a flat, unliving expanse into a body fit for the spark of life to inhabit. For them, creating a child is an exercise not of hard craftsmanship but of abstract logic.

One of them stalks forwards, her whole body flexing and breathing with each step. "What is your purpose here, Woodman?"

Tam bows his head, trying for respect but managing only an attitude of defeat. "Gold, Great Magician."

"A thief!" the other Folded One exclaims, and the Scull draws back his glinting point.

"No, Great Magicians!" Tam protests. "Please. I am carving my child.



I have her body laid out, every joint and rod of her. I have worked her as best I can.” Before their hostile regard his shoulders slump and he feels bitterly the coarseness of his articulation. Even the language of his body is a crude and halting thing. “I am a simple creature. My parent was a simple creature, hers before her and his before him. Each of us has trusted to what we had to make our children, and so we made them nothing more than we were. We are crude wood only.”

“As it should be,” spits the hollow voice of the Scull, but the first magician, the Folded Woman, rustles in disapproval and the metal warrior falls silent.

“And so you seek gold,” she clarifies.

“Gold is greatness.” Looking on her, Tam can see the gold leaf writing that covers every plane of her body. He has seen the great nobles of the Woodfolk, too, varnished and polished and set with precious metals. He does not aspire so high, but a little gilding would make his child beautiful. Perhaps then she could be more than he has ever had the chance to be.

“Gold is rare,” the Folded Woman says thoughtfully. “Many come to us – great steel lords of the Scullery, sandalwood-scented nobility, Waxworkers from the Candle Kings. They come seeking our learning and advice; they come begging us to take their children – to work them hard as servants if only we teach them our magic as well. They come for our gold, but we open the Casket of the Hoard for few, even though they bring us gifts from every corner of the Tower. What gifts do you bring us, Tam of the Woodfolk?”

Tam shivers when she pronounces his name, knowing that only magic can have carved it from his mind. “I bring you nothing,” he says, “for I have nothing except these two hands. I can offer only my labour: I am strong, I will not break easily. Use me however you wish, if only my child may be something more than me.”

The two Folded Ones lean close together and whisper in their dry, scratchy voices. Tam remains crouching low under the glowering metal stare of the Scull.

At last, the Folded Woman steps to the Shelf’s edge and looks over, heedless of the drop. If she falls, she will flutter and dance to the floor far below, stepping out of the air no worse for the flight. Tam, on the other hand, would shatter to pieces against the unyielding boards of the floor.

“That is a long, long climb,” she observes.

Tam can only nod.

“We have servants, many servants,” the Folded Woman says softly. “When the powerful visit us, the service of their people is first amongst their gifts. We would never lack for menials. Mostly we refuse such offerings.”

Tam sags, but says nothing.

“A remarkable effort, that climb,” she adds, and then turns her creased back on the drop. “Of all our visitors, none has come to us by such a route in many generations. I admire such dedication.”

Tam is braced for the refusal, hoping at least that he will be allowed to attempt the climb down. Weighted by disappointment, he does not know if he will make it.

“You will take your child to the Maker next Source-day?” the Folded Woman asks Tam.

“I will be ready,” he confirms. “I have even scored the grooves where the gold would go, if there was gold.”

“We have many apprentices offered to us,” the Folded Woman says. “But none of your kind; none with your determination. Determination is a great virtue in a magician. Tam of the Woodfolk, labourer, we will give you gold, but in return your child will come to us when she has learned to master her body. She will study, and we will see what manner of a magician the child of Tam might become.”



Many days pass before Tam is ready for his work to go before the Source. As with the wood of her body, so he had been slow and careful with the precious gold: melting down the curved shaving the Folded Ones had given him, pouring out the molten fire into his exacting moulds and then laying each thread and line in place.

She will be beautiful, if she lives. He cannot afford varnish or polish, but each segment of her body is carved with all the care a parent can give. Every joint moves smoothly, neither stiff nor loose. Her pegs and pins fit so flush that not even the least mote of grit can creep in to trouble her. Her face will be twice as expressive as his – he traded a year of his labour to an Artificer from Long Clock in return for the plan and pattern of her features.

He is ready now, though, every piece in place, and Source-day has come around, so he lays her in his handcart and takes her on the long road to the centre of his people's world. Nor is he alone: dozens of parents, whole families, the great and the mighty, they are all on the same journey. At first he is surrounded by other common Woodfolk, and then he makes way for the caravans of the mighty who travel with guards and in comfort. Then there come men and women from other tribes: slouching Fabrickers with serpentine lower bodies, metal Skulls, even ornate Scrimshanders, the details of their surfaces inked into fearsome designs. And they are enemies, some of these folk, or have been, or will be. And yet, on a Source-day, all the people of the Tower come together as one and remember their common ancestry, that is the magic of their Maker.

Their oldest legends speak of when their world came into being: how, in another age, he fashioned the first of them with his own hands for his own purposes. There are a hundred variations, each of the tribes claiming they came first – and ten times as many explanations for how history has unfolded since.

Tam cannot remember his one past visit to the Source. That was when the spark of life had leapt to his crude wooden body, turning him from a thing into a person. He has heard tales, and had thought he was ready. When he steps into sight of it, though, he drops the cart handles and then drops to his knees. All around him, others are doing the same. It is not a vision to leave anyone unmoved. Some cover their faces, some throw out their arms in worship. The rich climb from their carriages or rein in their tame rats and ravens. The vista would take their breath away, if any of them possessed it.

There, in the centre of the Source Hall, stands the Maker, a gigantic form that their own approximations can only mock. Tam would not quite reach the bony knob of his ankle. His face is lost far above them, and the superstitious say that to gaze into those set features is to bring a curse down on any so foolish. The Maker's flesh body is sheathed in a robe of heavy cloth that glitters with gold thread and arcane sigils. He stands with his arms out, frozen in place within a circle laid into the floor. Brass and gold, silver and unknown woods mark out that boundary, fashioned with a craftsmanship that all there can marvel at. And it crackles and glows with magical power.

Along with all the other parents, Tam walks as close as he dares to that

searing barrier. Too far away is to risk the spark not jumping to the body he has spent so long crafting. Too close is to invite destruction, the magic arcing to him and incinerating him entire. All around him, each parent is choosing how far to go before laying down the body of their new-made child. Tam keeps walking, whilst around him others reach the edge of their courage, stooping to set down their burdens.

Somewhere close there is a flash and crackle of white power; some soul bolder than he has been rebuked for it. He smells molten wax, and knows some Candle Lord has burned once and forever.

He feels the air grow tight as a vice around him and his feet stop of their own accord. Before him, the edge of the magical circle is like a flat wall of silver light. Fingers of magic writhe across the Floor towards him.

Feeling every joint tight with tension, he sets down his handiwork and then backs away, watching for the moment when it ceases to be simply an exercise in carpentry and gilding and becomes his daughter.

She is one of the last to be touched, as though even the Source respects place and precedence over craftsmanship and honest toil. At last, though, the crackling lines of power brush the grain of her body and she jerks and flails and comes alive.

Tam names her Liat.



Liat takes a year to master a mind that can understand her world and herself, far less time than Tam spent creating her body. That mind will grow and change, while her hard form will only ever degrade. Not for her the long-preserved life of a varnished magnate. She has only a dozen short years, a score at best before wear and tear and damp will split and destroy her. She must make the most of them, and she is fated to live them through trying times.

When she is ready, her father takes her to the Shelf as he promised. Not for them the arduous climb of his first visit. They stand in the lift with other hopefuls whose near-mint bodies show their youth. Many will descend just as easily, turned away after falling short of the Folded Ones' occult criteria. Liat is different; she is sent for.

That is one more mark against her, in the minds of her fellow students of magic. Most of them are the children of the wealthy; even the gold

filigree that sets off her face and form pales before their lavish construction. She is the poor one, the one whose parent has no powerful friends, no wealth or influence. She has only the body Tam gave her and the mind kindled into life by the Source's touch.

In the first year of her apprenticeship she learns much of the Tower which is her people's world. She learns the deep history of the Maker – what little is known. She learns about all the tribes: paper, cloth, wood, metal, wax, bone, all the rest of them, the great and the small, the famed and the obscure. She discovers that there is a formal name the Maker gave them all: Homunculi.

In her second year, her fellow students – those who have not been summarily dismissed as failures by the Folded Ones – have grown to acknowledge her patience and determination. There are many who leap past her with their quick understandings, but she catches up with them all and exceeds most. Many still resent her as an upstart, but she carves away at their prejudice until she fashions it into grudging respect. By now she is learning true magic, the manipulation of the raw power that suffuses every part of the Tower. It is the magic of her birth; the magic that animates her people's disparate limbs. For countless years before ever the first Homunculus was crafted had the Maker dwelled in the Tower and worked his spells. Magical energy spilled over from his every working until his home and everything in it sang with invisible fire.

The story she learned from Tam – the common story all the tribes tell – is that the Maker retreated to his circle because he loved his creations and wished them to have an everlasting well of life. So he stands, frozen in mid-invocation, and watches over his surrogate children.

A few unorthodox Folded Ones have a counter-story, after studying the workings of that circle for three hundred years. The Maker is trapped, they say. There is a flaw in his work that has undone him, caught him in a world that slowed and slowed until, for every second that passes within the circle, centuries flit by outside. They say the Maker does not care or even know about the tribes of the Homunculi who steal from his goods to craft their children, and from his power to give them life.

But even those few Folded Ones claim that he would be proud if he could know. Should he ever wake, they believe he would smile upon the kingdoms and principalities that have grown up about his ankles. He would, they are sure, be a just god. Why else make the first of them in his

own image?

Liat goes to the hall of the Source several times to study the magical workings there. Once, a raven-rider takes her to cross the invisible beam of the Maker's gaze. She stares at that fleshy face, and knows it for the exemplar of her own smooth blank eyes, the simple ridge of her nose, the deft slash of her mouth. No curse strikes her down.

In her third year of study, Tam makes the long journey to visit her. Seeing his coarse form, at first she is embarrassed. The snobbery of her fellow students has worked into her grain like invisible dust. One of her teachers – the Folded Woman who met her father years before – makes a point of greeting him respectfully in full view of everyone. Liat sees her own hollowness then, and runs to him.

Tam is worn down, his joints warped so that some movements are too wild, others grinding and stiff. He has lost some segments of his fingers and there is a crack running down from the crown of his head and through his face. Time comes for all the tribes: in rust, in rot, drying out or flaking away. Tam does not have long but, when he sees his daughter amongst the magicians, his face creaks into a smile that threatens to split it open with pride.



It is in that next year that the tribes of the Tower have their world changed forever.

They have some commerce with the world beyond their high walls. Those who are bold enough take the ravens out of the high windows and forage the wooded slopes beyond. It is a dangerous life – many come back damaged, and others not at all. There is little out in the world that finds a Homunculus palatable prey, but many creatures only discover too late for their victim that not all moving things are edible.

One of these raven-riders comes to the Shelf now because, in times of great disturbance, it is always to the magicians that the tribes turn.

He is a Fabricker, and he comes to them sodden with mist, his body scarred with old rips hastily darned. One of his eyes is a red bead; the other was lost long ago, leaving only trailing threads.

“Something approaches the Tower,” he tells them through grey cloth lips. “Something new, something huge, something ... I dare not say. I will

be cursed.”

So there is nothing for it but that one of the magicians is flown out into the vastness of the world to see this strangeness. Liat is among those who volunteers and it is she they choose. She knows it is a final splinter of prejudice, from those amongst the Folded Ones who have never quite accepted her, but she is glad to go. She has become an accomplished magician and, like her father, she sees boundaries as things to be overcome, not lived within.

So the rider coaxes his mount into taking the extra weight, and the bird flies off through the halls of the Tower, up to the highest chamber where the windows are. Here is the great expanse of the Bed, its sheets riddled with carefully cut holes where the Fabrickers have stencilled out the patterns of their children. Liat finds the experience of flight liberating rather than frightening. The beat of the bird’s wings say *freedom* to her.

The Fabricker she rides behind has the coil of his lower body grasped about the loops of his saddle; she herself has been tied in behind him. She is glad of it when the bird arrows through the empty gap of the window and the wind tries to make a plaything of her. Then she is too busy taking each new thing in – and failing, for the world is too vast, even this little piece of it. There are trees and clouds, earth and rock. There is the great blue vault of the sky above, that puts all the ceilings of her home to shame. But this is not what she has been brought here to see.

“There!” the rider tells her and leads his bird down. She sees the foot of the tower, the great grey wall that seems to rise up all the way to the sky, though she was almost at its apex so short a time before. She sees a great door of wood and brass that seethes with magic wardings to her sorcerous eyes. And before the door is a fire, and about the fire are *things*.

She knows them instantly. She understands why the Fabricker would not name them.

They are like the Maker. They are built on the same gigantic scale. They are made of the same flesh, whose life owes nothing to that spark of power that moves Liat.

They are three. Liat sees differences between them – and between them and the Maker – but all vast, all close as kin to her blank wooden gaze.

“Land,” she tells the Fabricker. He gives her a wild glance from his single bead of an eye, but he has the raven flutter down as close as he dares. They are a long distance from the fleshy giants, from Liat’s

perspective. For the enormous creatures themselves, if they spotted her, they could lunge forward and grasp her without getting up from their fire.

Liat unties herself from the saddle and drops to the ground, vanishing amongst the undergrowth. She follows the glimmer of the flames, skirting beetles and centipedes that flick curious antennae in her direction. At last she is crouched in a tussock of grass, watching the giants. Their mouths open, voices rolling from them like distant thunder. At first the words are just noises but soon she can distinguish the meanings in there, if only she can open her mind wide enough to cram the vast words in. Their language is her language, the Maker's language.

"Tomorrow I'll try Isomon's Compass," one booms out. Liat names that one Red Coat for its most prominent garment. "I felt the warding weaken today under the Persuasive Awl, and the Compass is an extrapolation of that."

"I say we get an axe and a little protection and just hack our way in," says another whom Liat decides will be Steel Hat.

"How are you still alive?" Red Coat upbraids its companion. "This is Arcantel's Tower. The actual Arcantel, the greatest mage of the Grey Age. You don't go up against that kind of magic with an axe."

"*You* say it's Arcantel," the third grumbles. That one will be Mouse Face for, like the Maker, it has bushy growths all about its nose and mouth and chin. "I say it's just some tower. Some hermit lived and died here, no more."

"Some hermit with a whole barrel of magic," Red Coat announces cheerily. "So hardly a loss either way. But let's go careful. If the previous owner knew their stuff then we just don't have enough protection to go in mob-handed."

Liat calls on her own magic, little twitches of her wooden fingers shaping a lens to peer at the giants through. As their rumbling talk suggests, they have some power with them – not in their bodies, but in various objects about them. And plainly they are magicians of a sort.

"It's going to be traps all the way up," Steel Hat complains. "Demons and golems and phantoms."

"Then save your axe for them," Red Coat decides. "Now sleep and dream of treasure, and I'll try some more tricks in the morning. Korda, you've got first watch."

Korda – Liat prefers Mouse Face – grumbles even more at that, but



remains sitting up as the other two lie down. Liat watches, fascinated: she had not thought that they would need to sleep like mice or ravens. It seems a ludicrous flaw in the construction of such mighty creatures.

A little magic casts a veil over her – harder to see, harder to hear and smell. She is leery of using too much enchantment – all too easy to hide herself but have the hiding spells give her away. She crosses the open ground between the grass and the giants in fits and starts, uneven and aimless as a dry leaf.

Mouse Face is staring out at the darkness, back to the fire, but those fluid eyes are looking for beasts of a size to cause these giants trouble, not for a little skitter of motion on the ground. Liat creeps about in Mouse Face's very shadow until she reaches Steel Hat. The hat itself is beside the giant's head and, for a moment, she pauses to regard that spectacular wealth of metal, wondering what the Sculls would barter for even a body's weight of it. Steel Hat's other garments are of many materials – she sees leather, bronze and a dozen different fabrics, many completely new to her. *They have such riches!* she thinks, amazed. About one of the giant's fingers is a circle of gold that gleams in the firelight and she considers her own gilding, and how mean and poor it seems compared to such a quantity of precious metal.

The heat of the fire is beginning to feel uncomfortable and she moves on, keeping the great mound of Steel Hat's sleeping form between her and the flames – and between her and Red Coat, for she is wary of the magician's notice. She stops again at the giant's waist, seeing there a leather band of great thickness, extravagantly ornamented with brass. There is a huge sack looped through it, and she steals forwards to examine it. It is a bag she could easily climb into.

She has with her a shard of glass knapped to an edge that can carve wood or kill rats, and with it she gently works at the sack until she has cut a slit into it. More gold meets her eyes: great sun-yellow discs such as the Folded Ones keep in their vast casket on the Shelf. She scuttles back from the sight of it, as though her covetous gaze alone might wake its owner.

By now she is so jittery that she can feel herself tremble at every point of articulation. Still, she moves round the feet of Steel Hat, that rise above her like mountains, and approaches Red Coat. The face of the giant magician is turned towards Liat, and she tries to read it, to parse the fashioning of those great coarse features. But the faces of the giants are too

malleable to understand.

She is seized by a mad impulse then: to go to Red Coat and stand before those eyes and greet it, magician to magician. To welcome the Maker's long lost kin to the domain of the Homunculi.

But that is not her choice or her place. Instead she runs back to the patient raven and its rider, and has them take her back to the Shelf.



Every magician is there to hear Liat's report: allies, rivals, enemies, the potent and the newly apprenticed. She spares nothing, tells them all, her account concise and ordered. Then they question her: incredulous, horrified, eager, greedy, doubting. More than once she is called a liar, but the Fabricker is there to attest to much, and the rest she carries with her own words. The magicians are thrown into uproar. Their world is tottering: the giants themselves are dwarfed by the implications of their presence. They are ambassadors from a distant world that the Maker must have left to build his Tower. They are magicians, and perhaps each one of those enormous hands has the potential to craft whole new races of Homunculi. Perhaps there are countless other tribes of little people all through the lands of these giants.

And, while they talk, Liat thinks of Red Coat using its strangely named spells to test the magical warding of the Tower's door. None of the Homunculi have ever thought about trying to open that door – the Tower is nine-tenths of their world and, for the rest, they have the ravens. Soon enough someone has a rider fly down to the tribes of the Base and the Cellar – the strange far people of stone and coal and cobweb – to tell them they may soon have guests. The raven returns swiftly, for messengers from the Base were already making the long climb of the Steps to warn the upper storeys.

And at last the Folded Ones and their fellow magicians come to a decision and call up every raven rider that will heed them. Messages go to each tribe to gather the wise and the mighty. This is no matter that the magicians can hoard like they do their gold. A new world is quite literally knocking on their door and all the nations of the Homunculi must decide how to answer.

The birds bring them in from every hall: representatives of a hundred

tribes. Glass, steel, copper, wood, lead, stone, ivory, all the materials of the Tower are represented. Every one of them has a voice in the grand council, spread out on the Floor of Shelf Hall. There, the Folded Ones recount Liat's story and the shock of knowledge ripples out through the crowd. They are no longer alone.

Speculation runs rife. Some speak of the magic these giants bring. Will they gift new life to the Tower, swelling the numbers of the tribes? Is the Source no longer the centre of their world? Others rub their crafted hands and consider the riches. What materials can be bartered for, with such founts of plenty? Or perhaps, some of the Folded Ones whisper, the giants will speak to the Maker and rouse him from the frozen moment that has held him for so long. Perhaps this is some destined final age of their world, and at last the Maker will look upon the sprawling civilization of his creations and see what they have built in his absence.

*We have used his gifts wisely, some say. We have multiplied. We have carved and crafted each substance he left us, made the bodies that he has then gifted with the spark of life. He will be pleased, surely.*

They talk of embassies – how they may best impress Red Coat and its fellows. Which tribe is the most splendid? Who shall speak the welcome?

By now, word has spread from the mighty to the lowly. There are a thousand competing threads weaving amongst the tribes: some of hope, others of fear. All they can surely know is that nothing will ever be the same.

All this time, the raven-riders and the magicians keep an eye on the giants as they work on the door. Red Coat tries enchantment after enchantment, and the Homunculi can see the warding weaken each time, slowly unravelling. Red Coat seems to work half-blind and fumbling, its eyes unable to see the magic as can those animated by it. More than once, someone suggests that they simply go and advise: what better way to announce their presence to the giants than with a helping hand, however tiny?

The magicians can see that another day, two at the most, will see Red Coat pick enough of a hole in the warding to open the Tower. The magic will remain, pent up in door and wall and floor, but the giants will be able to slip inside like one lifting a curtain to creep beneath it.

The great council of all the tribes has prepared its response by now. A grand delegation will meet the giants on the Steps, taking higher ground to

make up for their smaller stature. They will have magicians to demonstrate their learning, beautifully crafted nobles to show their value. There remains much argument on that latter score, as to whose body will best please the eye of a giant.

Liat takes no part in these deliberations.

Liat co-opts a raven and travels to the Source. She wings past the stern visage of the Maker, caught in his eternal instant of concentration. *If he knows of us, why did he not leave a smile for us?* Then she has a rider fly her down to spy on the giants once more, in all their gargantuan splendour. She wonders at the sheer *quantity* of them, not the meat of their bodies but their tools and garb and possessions. Each one wears the makings of five hundred of her people. *How we might profit from meeting them!*

She watches Red Coat prying at the wardings, only half-aware of how close it has come to success. Mouse Face has gone hunting and comes back with rabbits, deftly shucking the skins off and setting them above the fire to burn as an offering. Steel Hat is in a foul mood. It has discovered the incision to its pouch and is complaining it has lost a coin – one of those sun-bright golden discs. Red Coat laughs and says there will be plenty beyond the door.

Watching them, Liat knows they are not expecting her world, nor can their homes be peopled as the Tower is peopled. They have brought no little companions with them on their journey. Beyond the door is more than the giants can ever guess at.

She flies back to the high halls and sits on the windowsill, staring out across the forested mountainside towards the blur of the horizon. Everyone knows that the world beyond the Tower goes on forever, but nobody knew how far Forever was. Now it seems there is an entire nation of Makers at some undreamt-of distance, for whom the whole world of the Homunculi is just one tower and a few trees.

She thinks of Steel Hat complaining about its pouch.

The council is still in session when she arrives on raven-back. The gleaming magnates of the Sculls and the varnished grandees of the Woodfolk are posing and strutting at each other over who should have the honour of greeting the giants.

“Hold!” She lands in their midst, the thunder of downbeating wings scattering all those shining lords and ladies. “Listen to me!”

The next day, Red Coat's efforts finally twist the warding sufficiently out of shape that the three of them can enter. The giant magician takes the lead, Mouse Face and Steel Hat treading thunderously after it.

"Finally," Steel Hat booms.

"What about the traps?" Mouse Face demands.

"Fizzard's Diviner shows a truly huge concentration of magic in the upper levels, enough to stand out against all this background buzz," Red Coat announces happily. "Fear not, valiant comrades, we've hit the motherlode. Get your flasks and sacks and pouches ready for filling, and step carefully." They move into the hall of the Base, where the Steps start.

"There are candles still lit," Mouse Face points out. "Someone lives here."

"That warding has stood for centuries, and if you can protect a door like that, you can keep a few lamps lit," Red Coat says dismissively.

In the candle's shadow, Liat and her fellow magicians crouch, still as sticks and stones and other unliving things. Will Mouse Face look closer, and discover their minuscule presence?

But Red Coat does not care about candles. Red Coat is heading for the Steps, and the other two follow her.

Liat feels for the magic in the walls and the floor – in the very air of the room. The Maker dwelled here so long that there is not a mote of dust that is barren of power. Around the hall of the Base, other groups of magicians are hidden. She feels them working, and adds her strength to theirs. Perhaps, compared to Red Coat, they are but tiny sparks, unnoticeable against the glare of the Tower itself. They are working together, though, and they are master crafters as all the Homunculi are.

She had thought about Steel Hat and the purse, and how angry the giant had been at losing even one coin. The giants are fabulously wealthy. Her parent Tam had been very poor. She understands the rich as the rich themselves – the other magicians and their patrons – cannot. She understands that the rich are not rich because they stop every day to share their wealth with those less fortunate. The polished chiefs of the Woodfolk did not come to Tam with gifts of rare timber and varnish; the aristocrats amongst her fellow students did not welcome their lowly sister with open arms.

She thinks about the Casket of the Hoard, that sits by the Left Bookend

of the Shelf. Tam risked his life to win one little shaving from one coin from that Casket, the entire contents of which would fit easily into Steel Hat's open hands.

She feels the great web of magic in the walls of the Base twitch and tighten, and knows the moment has come. Along with all the other magicians she pulls on it, twisting the flow of power around them, gathering up the strength of the thwarted warding.

"Wait!" Red Coat cries out, a hand held up, but the giant is a thing of flesh, not of magic. It can see the workings around itself only as dimly as Liat can perceive the far horizon.

Steel Hat fumbles a great edged weight of metal from its waist. Mouse Face tries to push past and get back through the door. Red Coat is calling magic, strong magic, brutal and clumsy and all too late.

The discharge of power about the Base illuminates every edge and surface of the hall, coursing through the magicians and all the families of Homunculi cowering in their homes. It incinerates all the mice and spiders and woodlice luckless enough to dwell in that room. A blaze of white fire lights on Red Coat and Mouse Face and Steel Hat and consumes them utterly, not even ashes left of their flesh and blood and bone. Their screams are vast and angry and brief.

But their unliving things, their goods and gear, remain untouched, just as the Homunculi themselves are untouched. One by one the magicians creep out and look down on their handiwork, and know that their people and their civilisation have survived the first great test of extinction.

*For they were rich and we are poor, Liat thinks. And they would have taken everything we had and everything we were, and counted it as but little.*

The next day, the magicians and leaders of the tribes meet and cautiously begin to discuss what happens next. A few claim that no more giants will come, but most accept that their years of isolation are at an end. They do not know if Red Coat was counted a great magician of its kind, or just an apprentice. The next to visit may not be so easily dealt with.

Liat talks and, when she does, they listen. Liat speaks of the wider world from whence the giants came. She speaks of magic that is not the Source but can be drawn upon. She speaks of colonies built around the magically charged devices the giants brought. She speaks of making new devices, seeds for a diaspora of the Homunculi. Wherever there is power,

they can craft their children and give them life. She speaks of how far a raven can fly. She speaks of not waiting for the world to come to them.

They cannot make war on the giants, and if the giants come to them again, all their tribes and ways may end.

“So let us go to their world,” she tells the council. “Let us find our way into their homes. Let us carve at their wealth. Let us overhear their words. Let us learn their ways and their magic. And, when we are ready to offer peace to them, let us have grown strong enough to fight if they refuse.”



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# The Time Invariance of Snow

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**E. LILY YU**

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# 1. The Devil and the Physicist

Once,<sup>1</sup> the Devil made a mirror,<sup>2</sup> for the Devil was vain. This mirror showed certain people to be twice as large and twice as powerful and six times as good and kind as they truly were; and others it showed at a tenth their stature, with all their shining qualities smutched and sooted, so that if one glimpsed them in the Devil's mirror, one would think them worthless and contemptible indeed.

The Devil looked into his mirror and admired himself, and all his demons preened and swaggered and admired him too. And joy resounded throughout the vaults of Hell.

Eventually there came a physicist who, with radioactive cobalt and cerium magnesium nitrate crystals, sought to test the invariance of symmetry; namely, whether in a mirror universe the laws of physics would be reflected. As she touched and tested the mystery of the world and proved that symmetry did not hold, and that parity was not in fact conserved, she broke, all unknowing, the Devil's mirror.

Like the fundamental equations of quantum mechanics, like God Himself, the Devil is a time-invariant equation.<sup>3</sup> The shattering of the mirror shivered outward through fields of light cones, near and far, until the shattering itself became eternal, immutable fact. The fragments of the mirror drifted down through pasts, presents, and futures, clinging and cutting, like stardust and razors.

Whoever blinked a sliver of the mirror into his eye<sup>4</sup> saw the world distorted ever after. Some observed that they were far worthier and more deserving than others, and pleased with this understanding, went forth and took whatever they wished, whether wives or slaves, land or empires.

Some looked at themselves and saw worthlessness. At that sight, whatever pyrotechnic wonders they dreamed died in secret within them.

Others, of particular sensitivity, felt the presence of the glass, which a slow and uncertain part of their souls insisted had not been there before. A

few of these tried gouging it out with knives, though it was not a physical construct and could not be thus dislodged. A very few made fine and fragile spectacles for the soul, to correct its sight, and walked long in clarity and loneliness thereafter.

This is how the Devil's mirror worked:

A woman warned a city of its destruction, of soldiers creeping in by craft, and her friends and family laughed her mad.

The city burned.

The woman was raped, and raped again, and murdered.

A woman stood before men who would become consuls and said, believe me, I was forced by this man. To be believed, she struck her own heart with a dagger.

A woman stood before senators and said, believe me, I was—

A woman stood before senators and said, believe—

A black woman said, listen, and no one heard.

A dusky child cried, and no one comforted him.

An indifferent cartographer divided other people's countries into everlasting wars.

The physicist died. Her male colleagues received a Nobel Prize.<sup>5</sup>

The Devil looked upon his work and laughed.

## 2. K. and G.

It was summer, and the roses swam with scent. K. had tamed G. with intermittent kindness, as boys tame foxes to their hand, though she had been watchful and wary, knowing the violence of men. Now G. rested her head against K.'s shoulder, and they breathed the soft, sweet air together with the laziness that only summer knows. The two of them were not young; neither were they old.

If I were going to murder you, K. said musingly, I would tie you up while you slept, nail you into a splintery box, and shove the box out of a car going seventy into the path of a truck. The splinters would be driven into your body on impact.

G. was silent for a long time.

At last she said: When you described murdering me—

Yes?

I felt afraid.

K. said: I was joking.

G. said: Still, I was afraid.

K. said: I had good intentions. What on earth do you want?

G. said: Just for you to say you're sorry.

I can't believe you're blowing this up into such a huge deal.

You know about—

Well, I'm *sorry* that women are sometimes harmed by men. But this is insane.

That's the glass talking.

What?

The sliver of glass in your eyes and in mine.

K. pushed back his chair so hard it tipped over.

We both contributed to this situation. You have to be more patient and kinder to me.

G. said: I can't.

Fine, K. said, stamping his foot. A breath of winter blew across them both. The rosebush's leaves crisped and silvered with frost, and its full-blown flowers blackened and bowed.

I'm leaving, K. said. There was ice in his voice.

G. said: I know what will happen. I will follow you down a stream and into a witch's house, into a palace, and then into a dark robber's wood, and in the end I will walk barefoot through the bitter snow into a frozen hall, to find you moving ice upon the pool that they call the Mirror of Reason.

I will come thinking to rescue you. That my tears will wash the glass from your eye and melt the ice in your heart. That the Snow Queen's spell will break, and you will be free.

But when I arrive I will find no Snow Queen, no enchantment, no wicked, beautiful woman who stole you away.

Only you.

You, who choose cold falseness over true life.

I know, because I am no longer a child and have walked down this road.

I will not go.

She said these words to the summer air, but no one was around to hear.

### 3. The Ravens

The prince and princess, king and queen now, were not at home. The tame ravens in the palace had long since died.

None of the ravens in the old wood knew her. They rattled and croaked as G. went by.

Imposter!

Pretender!

Usurper!

Slut!

Unwanted!

Abandoned!

Discarded!

Die!

Oh, be quiet, G. said, and continued on her way.

## 4. The Robber Queen

You're back, the robber queen said, testing the point of her letter opener against her desk. Didn't think I'd see you again.

Didn't you get my postcards? G. said, sitting.

The office was darker than she remembered, for all that they were on the hundredth floor. Outside, other buildings pressed close, like trees.

You know I screen my mail.

I know couriers and postal workers wouldn't dare to stop here.

The robber queen said: I'm good at my job.

So I've heard. I'm proud to have known you when.

Spill, the robber queen said, or I'll tickle your neck with my dagger for old times' sake. Is this one handsome, at least? Because the last one—ugh. Does he cook? Does he clean? Please tell me this one, this time, is worthy of you. Tea or whiskey?

Theodora, G. said, you're so laughing and fierce. How do you do it?

Love 'em, leave 'em. Sometimes I even leave them alive. But once you taste a man's still-beating heart—

Forget him, G. said.

So there *is* a him.

A mistake. But I'm not here about that. I'm here to ask for a job.

This isn't the United Nations, G. We do dirty, filthy, bloody work. That I'll be hanged for, if I'm ever caught.

You have power, G. said. I don't know what that's like. To hold a knife, with another person's life on its edge. Teach me.

Mine is a raw and common power, the robber queen said. What you have is greater.

I have nothing.

Stop, or I'll cut off your little finger so you'll never forget. I don't know how or when you got it. Maybe the crows taught you, or the Lap women. Your eyes see to the soul. Your words cut to the bone. Men and



women are stripped naked before you. Now, if you'd only *use* that power, you could hurt those you hate with an unhealing harm. I'd give my three best horses for that.

G. said: No.

Say, such and such is the shape of your soul, though you wear mask upon mask to hide it.

Theodora, G. said, a wolf is the shape of your soul, and there's blood on its muzzle and mud on its pelt.

It is! And I'll never hide it.

Are you sure you won't let me rob one company? Just for the experience?

This is an investment firm, not a charity. Speaking of which, I'll be billing you for my time. Must keep the numbers regular.

Someday when I have money, I'll pay you, G. said.

That you will.

## 5. The Lap Women

Old they were, in appearance far older than time: their eyes seams of stars, their fingers the knurls of ancient oaks. They rocked in their maple rocking chairs, knitting blankets with a pattern of silver fish from a silvery wool. The fish gathered in soft clouds around their feet.

G. said: I'm sorry I haven't visited or called.

They smiled at her and continued to rock. One by one, fish slipped from their needles' tips.

G. said: I'm sure you have family. Daughters or sons who bring fruit and chocolate. Somebody. You must have somebody.

They continued to rock.

Can I help you? a nursing assistant said.

These are old friends of mine, G. said, blushing as she said it, for years of silence and absence had passed. I came to ask their advice.

Good luck. They haven't spoken since they checked in. And that was fifteen years ago.

G. said: That long?

Time can jump you like that. Leave you bruised in an alley with no memory at all.

Is there anything they like to do besides knit?

Cards, the assistant said. They'll skin you in most kinds of poker, and they're fiends for bridge.

Then I'll stay and play cards with them, if they wish.

You'll regret it, the nursing assistant said. But she went and fetched a worn deck anyway.

At the sight of the cards, the three old women jabbed their needles deep into their skeins and rose from their rocking chairs, holding out their hands.

G. proceeded to lose every bill from her wallet, her sweater, the cross on a chain that she wore, and the black glass buttons on the front of her

coat.

The eldest Lap woman took her sewing shears and snipped off the buttons, one-two-three-four. Then she picked up the hillocks of silver knitting, finished each fragment, and whipstitched the three clouds of fishes, each cloud a different gray, into a single long shawl. This shawl she draped around G.'s shoulders.

Thank you, G. said. I think.

All three Lap women smiled gentle, faraway smiles.

The nursing assistant scratched her ear.

Are you going somewhere cold? she said.

G. said: Very.

## 6. The Snow Queen

It was hours and hours until dawn, and the world was a waste and a howling dark.

At some point in the distant past, the sweep of ice beneath G's feet had been chopped into a stair that wound up and around the glassy mountain. As she climbed, thick snowflakes clung to her lashes. She had the shawl of silver fish wrapped around her for warmth and sensible boots on her feet. She needed no guide, for she knew the way.

Before she left, G. had knelt and prayed as trustingly as she had when she was a child, and now she held that prayer like a weak and guttering taper.

Here was the Snow Queen's palace: smaller than she remembered, as if her child self's memories had exaggerated its dimensions, or else whole wings and wards had melted away. Frost blossoms still bloomed from windows and eaves. Crystalline gargoyles crouched in its crenellations.

Collecting her courage, G. pushed the palace gates open. Her hands turned white, then red, with cold.

No one waited inside. No Queen. No K. There was only the vacant throne and the familiar, frozen pool with its shards arranged into the word *Eternity*.

It was quiet.

Her breath left her lips in glittering clouds.

G. crossed the hall, her steps echoing. The throne might well have been carved from the world's largest diamond. Like a lily or lotus, it peaked to a point. Rainbows glowed in its fractured depths.

On the throne's seat was a small crown of silvered glass.

G. picked up the crown and turned it in her hands. In that whole country, it was the only thing that was not cold.

The long glass thorns flashed fragments of her face: a sneer, a glare, a look of contempt.

Of course, G. said.

The jagged edges of her life shone brilliantly before her. In a moment she saw how they could be fitted together to spell out the forgotten word she had pursued all her life, sometimes glimpsing, sometimes approaching, never grasping entire—

One way or another, the Devil's mirror produces a Snow Queen.

G. raised the crown above her head, admiring how its sharpness shivered the light, how it showed her beautiful and unforgiving.

And then she drove it against the point of the diamond throne.

Across seven dimensions the glass crown cracked and crumbled. Glass thorns drove into G.'s wrists and fingers, flying up to cut her face.

Where the blood beaded and bubbled up, it froze, so that G. wore rubies on her skin, rubies and diamonds brighter than snow.

And the palace too cracked as the Queen's crown cracked, from top to bottom, like a walnut shell.

All around was darkness.

Down into that darkness G. fell, and time fell also, in fine grains like sand.

## 7. A Brief Digression on Hans Christian Andersen and the Present State of Physics

Considered as a whole, in all its possible states, the universe is time-invariant. When this insight is worked out and understood at a mathematical level,<sup>6</sup> one both achieves and loses one's liberty. We are freed from one enchantment, only to be ensorcelled by another.<sup>7</sup> And while the first is a snowy, crowded pond upon whose hard face the whole world may skate and shout, the second is a still and lonely (some say holy) place, where only the brave go, and from whence only the mad return.

Those who reach the latter place understand that it was always the case that they would come here. Perhaps they weep. Perhaps they praise God.

Who knows? And who can say?

## 8. G. and the Devil

At the end of her fall, G. met the Devil face to face.

He was pretty, in a moneyed way, sharp as polished leather, with a pocket square and black, ambitious eyes.

The Devil said: That's my mirror you're wearing in your flesh, in your hair. That's the mirror that I made. Me.

Why? G. asked, and in that question was all the grief of the world.

The Devil said: Because when one is alone in pain, one seeks to spread suffering, and so be less alone. It's quite logical.

But *why*?

When a dark heart gazes upon glory, a glory that the heart can never attain, then the whole being turns to thoughts of destruction.

*WHY?*

As the Devil continued to speak, his words plausible, his face reasonable, his voice reassuring, scorpions and serpents slid out of his pockets, clinging to each other in thin, squirming chains. And the chains crept and curled and reached for her.

In her hand, however, was the hard hilt of a sword, whose one edge was ruby and the other diamond. On her breast she wore overlapping silver scales. And in her other hand was a buckler burnished to the brightness of a mirror.

If the Devil noticed, he gave no sign.

Tell me the truth, G. said.

He said, Because you are ugly and it was a Tuesday.

G. swung the sword to her left and severed a whip of scorpions, then to her right, bisecting a braid of vipers. Slices of snakeflesh and crunched carapace tumbled around her. Of a sudden the Devil looked not so charming.

You think you can fight me? he said, ten times larger now, and growing, until his smallest curved toenail was the height of her head. His

voice was the thunder of ten million men.

G. said: I have seen eternity. I know you have already lost.

And she struck, her sword flashing bloodlight and lightning.

The Devil roared.



## 9. G. and K.

His hair was white, and he walked with a cane, limping like a crane as it hunts in the reeds.

Her own hair was silver, and her face and hands were scarred.

I'm sorry, he said.

I know you are.

I came all this way to tell you.

I knew you were coming, G. said.

You saw me plainly. I couldn't bear it. I wanted to hurt you, and I did.

G. said: It's all over now.

It is.

K. squinted at her, as if looking into radiance.

I see you've made your glass into a sword.

And you've made yours into a door.

A tempering all your life, then. A tempering and a war. As I have lived openings and closings. As I have yielded and withstood.

So you and I have been made of use.

We have, K. said. We have indeed.

# Notes

## 1. The Devil and the Physicist

1. The more we peer myopically into the abyss of time, the more we understand that there is no such thing as *once*, nor a single sequential line of time, but rather a chaos of local happenings stretching from improbability to probability.
2. Here too the concept of *mirror* is an approximation, for the phenomenon in question extended into a minimum of seven dimensions; but *mirror* is a close and useful metaphor.
3. Theology hopes for local boundedness, but as yet this remains unproven.
4. A poetic simplification to describe a quantum event affecting neural perception.
5. This too is a poetic simplification.

## 7. A Brief Digression on Hans Christian Andersen and the Present State of Physics

6.  $S = k \log W$ , which is to say, entropy is directly related to the number of states of a system. If we somehow could perceive all the possible microscopic states of the universe,  $S$  would be constant.
7. Imagine, say, a boy forming the icy shards of reason into a picture of eternity. The metaphor is not inadequate.



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## About the Authors

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