

Border Guards

by Greg Egan

In the early afternoon of his fourth day out of sadness, Jamil was wandering home from the gardens at the centre of Noether when he heard shouts from the playing field behind the library. On the spur of the moment, without even asking the city what game was in progress, he decided to join in.

As he rounded the corner and the field came into view, it was clear from the movements of the players that they were in the middle of a quantum soccer match. At Jamil's request, the city painted the wave function of the hypothetical ball across his vision, and tweaked him to recognise the players as the members of two teams without changing their appearance at all. Maria had once told him that she always chose a literal perception of colour-coded clothing instead; she had no desire to use pathways that had evolved for the sake of sorting people into those you defended and those you slaughtered. But almost everything that had been bequeathed to them was stained with blood, and to Jamil it seemed a far sweeter victory to adapt the worst relics to his own ends than to discard them as irretrievably tainted.

The wave function appeared as a vivid auroral light, a quicksilver plasma bright enough to be distinct in the afternoon sunlight, yet unable to dazzle the eye or conceal the players running through it. Bands of colour representing the complex phase of the wave swept across the field, parting to wash over separate rising lobes of probability before hitting the boundary and bouncing back again, inverted. The match was being played by the oldest, simplest rules: semi-classical, non-relativistic. The ball was confined to the field by an infinitely high barrier, so there was no question of it tunnelling out, leaking away as the match progressed. The players were treated classically: their movements pumped energy into the wave, enabling transitions from the game's opening state — with the ball spread thinly across the entire field — into the range of higher-energy modes needed to localise it. But localisation was fleeting; there was no point forming a nice sharp wave packet in the middle of the field in the hope of kicking it around like a classical object. You had to shape the wave in such a way that all of its modes — cycling at different frequencies, travelling with different velocities — would come into phase with each other, for a fraction of a second, within the goal itself. Achieving that was a matter of energy levels, and timing.

Jamil had noticed that one team was under-strength. The umpire would be skewing the field's potential to keep the match fair, but a new participant would be especially welcome for the sake of restoring symmetry. He watched the faces of the players, most of them old friends. They were frowning with concentration, but breaking now and then into smiles of delight at their small successes, or their opponents' ingenuity.

He was badly out of practice, but if he turned out to be dead weight he could always withdraw. And if he misjudged his skills, and lost the match with his incompetence? No one would care. The score was nil all; he could wait for a goal, but that might be an hour or more in coming. Jamil communed with the umpire, and discovered that the players had decided in advance to allow new entries at any time.

Before he could change his mind, he announced himself. The wave froze, and he ran on to the field. People nodded greetings, mostly making no fuss, though Ezequiel shouted, "Welcome back!" Jamil suddenly felt fragile again; though he'd ended his long seclusion four days before, it was well within his power, still, to be dismayed by everything the game would involve. His recovery felt like a finely balanced optical illusion, a figure and ground that could change roles in an instant, a solid cube that could evert into a hollow.

The umpire guided him to his allotted starting position, opposite a woman he hadn't seen before. He offered her a formal bow, and she returned the gesture. This was no time for introductions, but he asked

the city if she'd published a name. She had: Margit.

The umpire counted down in their heads. Jamil tensed, regretting his impulsiveness. For seven years he'd been dead to the world. After four days back, what was he good for? His muscles were incapable of atrophy, his reflexes could never be dulled, but he'd chosen to live with an unconstrained will, and at any moment his wavering resolve could desert him.

The umpire said, "Play." The frozen light around Jamil came to life, and he sprang into motion.

Each player was responsible for a set of modes, particular harmonics of the wave that were theirs to fill, guard, or deplete as necessary. Jamil's twelve modes cycled at between 1,000 and 1,250 milliHertz. The rules of the game endowed his body with a small, fixed potential energy, which repelled the ball slightly and allowed different modes to push and pull on each other through him, but if he stayed in one spot as the modes cycled, every influence he exerted would eventually be replaced by its opposite, and the effect would simply cancel itself out.

To drive the wave from one mode to another, you needed to move, and to drive it efficiently you needed to exploit the way the modes fell in and out of phase with each other: to take from a 1,000 milliHertz mode and give to a 1,250, you had to act in synch with the quarter-Hertz beat between them. It was like pushing a child's swing at its natural frequency, but rather than setting a single child in motion, you were standing between two swings and acting more as an intermediary: trying to time your interventions in such a way as to speed up one child at the other's expense. The way you pushed on the wave at a given time and place was out of your hands completely, but by changing location in just the right way you could gain control over the interaction. Every pair of modes had a spatial beat between them — like the moiré pattern formed by two sheets of woven fabric held up to the light together, shifting from transparent to opaque as the gaps between the threads fell in and out of alignment. Slicing through this cyclic landscape offered the perfect means to match the accompanying chronological beat.

Jamil sprinted across the field at a speed and angle calculated to drive two favourable transitions at once. He'd gauged the current spectrum of the wave instinctively, watching from the sidelines, and he knew which of the modes in his charge would contribute to a goal and which would detract from the probability. As he cut through the shimmering bands of colour, the umpire gave him tactile feedback to supplement his visual estimates and calculations, allowing him to sense the difference between a cyclic tug, a to and fro that came to nothing, and the gentle but persistent force that meant he was successfully riding the beat.

Chusok called out to him urgently, "Take, take! Two-ten!" Everyone's spectral territory overlapped with someone else's, and you needed to pass amplitude from player to player as well as trying to manage it within your own range. *Two-ten* — a harmonic with two peaks across the width of the field and ten along its length, cycling at 1,160 milliHertz — was filling up as Chusok drove unwanted amplitude from various lower-energy modes into it. It was Jamil's role to empty it, putting the amplitude somewhere useful. Any mode with an even number of peaks across the field was unfavourable for scoring, because it had a node — a zero point between the peaks — smack in the middle of both goals.

Jamil acknowledged the request with a hand signal and shifted his trajectory. It was almost a decade since he'd last played the game, but he still knew the intricate web of possibilities by heart: he could drain the two-ten harmonic into the three-ten, five-two and five-six modes — all with "good parity", peaks along the centre-line — in a single action.

As he pounded across the grass, carefully judging the correct angle by sight, increasing his speed until he felt the destructive beats give way to a steady force like a constant breeze, he suddenly recalled a time — centuries before, in another city — when he'd played with one team, week after week, for forty years.

Faces and voices swam in his head. Hashim, Jamil's ninety-eighth child, and Hashim's granddaughter Laila had played beside him. But he'd burnt his house and moved on, and when that era touched him at all now it was like an unexpected gift. The scent of the grass, the shouts of the players, the soles of his feet striking the ground, resonated with every other moment he'd spent the same way, bridging the centuries, binding his life together. He never truly felt the scale of it when he sought it out deliberately; it was always small things, tightly focused moments like this, that burst the horizon of his everyday concerns and confronted him with the astonishing vista.

The two-ten mode was draining faster than he'd expected; the see-sawing centre-line dip in the wave was vanishing before his eyes. He looked around, and saw Margit performing an elaborate Lissajous manoeuvre, smoothly orchestrating a dozen transitions at once. Jamil froze and watched her, admiring her virtuosity while he tried to decide what to do next; there was no point competing with her when she was doing such a good job of completing the task Chusok had set him.

Margit was his opponent, but they were both aiming for exactly the same kind of spectrum. The symmetry of the field meant that any scoring wave would work equally well for either side — but only one team could be the first to reap the benefit, the first to have more than half the wave's probability packed into their goal. So the two teams were obliged to cooperate at first, and it was only as the wave took shape from their combined efforts that it gradually became apparent which side would gain by sculpting it to perfection as rapidly as possible, and which would gain by spoiling it for the first chance, then honing it for the rebound.

Penina chided him over her shoulder as she jogged past, “You want to leave her to clean up four-six, as well?” She was smiling, but Jamil was stung; he'd been motionless for ten or fifteen seconds. It was not forbidden to drag your feet and rely on your opponents to do all the work, but it was regarded as a shamefully impoverished strategy. It was also very risky, handing them the opportunity to set up a wave that was almost impossible to exploit yourself.

He reassessed the spectrum, and quickly sorted through the alternatives. Whatever he did would have unwanted side effects; there was no magic way to avoid influencing modes in other players' territory, and any action that would drive the transitions he needed would also trigger a multitude of others, up and down the spectrum. Finally, he made a choice that would weaken the offending mode while causing as little disruption as possible.

Jamil immersed himself in the game, planning each transition two steps in advance, switching strategy half-way through a run if he had to, but staying in motion until the sweat dripped from his body, until his calves burned, until his blood sang. He wasn't blinded to the raw pleasures of the moment, or to memories of games past, but he let them wash over him, like the breeze that rose up and cooled his skin with no need for acknowledgement. Familiar voices shouted terse commands at him; as the wave came closer to a scoring spectrum every trace of superfluous conversation vanished, every idle glance gave way to frantic, purposeful gestures. To a bystander, this might have seemed like the height of dehumanisation: twenty-two people reduced to grunting cogs in a pointless machine. Jamil smiled at the thought but refused to be distracted into a complicated imaginary rebuttal. Every step he took was the answer to that, every hoarse plea to Yann or Joracy, Chusok or Maria, Eudore or Halide. These were his friends, and he was back among them. Back in the world.

The first chance of a goal was thirty seconds away, and the opportunity would fall to Jamil's team; a few tiny shifts in amplitude would clinch it. Margit kept her distance, but Jamil could sense her eyes on him constantly — and literally feel her at work through his skin as she slackened his contact with the wave. In theory, by mirroring your opponent's movements at the correct position on the field you could undermine everything they did, though in practice not even the most skilful team could keep the spectrum completely

frozen. Going further and spoiling was a tug of war you didn't want to win too well: if you degraded the wave too much, your opponent's task — spoiling your own subsequent chance at a goal — became far easier.

Jamil still had two bad-parity modes that he was hoping to weaken, but every time he changed velocity to try a new transition, Margit responded in an instant, blocking him. He gestured to Chusok for help; Chusok had his own problems with Ezequiel, but he could still make trouble for Margit by choosing where he placed unwanted amplitude. Jamil shook sweat out of his eyes; he could see the characteristic “stepping stone” pattern of lobes forming, a sign that the wave would soon converge on the goal, but from the middle of the field it was impossible to judge their shape accurately enough to know what, if anything, remained to be done.

Suddenly, Jamil felt the wave push against him. He didn't waste time looking around for Margit; Chusok must have succeeded in distracting her. He was almost at the boundary line, but he managed to reverse smoothly, continuing to drive both the transitions he'd been aiming for.

Two long lobes of probability, each modulated by a series of oscillating mounds, raced along the sides of the field. A third, shorter lobe running along the centre-line melted away, reappeared, then merged with the others as they touched the end of the field, forming an almost rectangular plateau encompassing the goal.

The plateau became a pillar of light, growing narrower and higher as dozens of modes, all finally in phase, crashed together against the impenetrable barrier of the field's boundary. A shallow residue was still spread across the entire field, and a diminishing sequence of elliptical lobes trailed away from the goal like a staircase, but most of the wave that had started out lapping around their waists was now concentrated in a single peak that towered above their heads, nine or ten metres tall.

For an instant, it was motionless.

Then it began to fall.

The umpire said, “Forty-nine point eight.”

The wave packet had not been tight enough.

Jamil struggled to shrug off his disappointment and throw his instincts into reverse. The other team had fifty seconds, now, to fine-tune the spectrum and ensure that the reflected packet was just a fraction narrower when it reformed, at the opposite end of the field.

As the pillar collapsed, replaying its synthesis in reverse, Jamil caught sight of Margit. She smiled at him calmly, and it suddenly struck him: *She'd known they couldn't make the goal. That was why she'd stopped opposing him.* She'd let him work towards sharpening the wave for a few seconds, knowing that it was already too late for him, knowing that her own team would gain from the slight improvement.

Jamil was impressed; it took an extraordinary level of skill and confidence to do what she'd just done. For all the time he'd spent away, he knew exactly what to expect from the rest of the players, and in Margit's absence he would probably have been wishing out loud for a talented newcomer to make the game interesting again. Still, it was hard not to feel a slight sting of resentment. Someone should have warned him just how good she was.

With the modes slipping out of phase, the wave undulated all over the field again, but its reconvergence was inevitable: unlike a wave of water or sound, it possessed no hidden degrees of freedom to grind its precision into entropy. Jamil decided to ignore Margit; there were cruder strategies than mirror-blocking

that worked almost as well. Chusok was filling the two-ten mode now; Jamil chose the four-six as his spoiler. All they had to do was keep the wave from growing much sharper, and it didn't matter whether they achieved this by preserving the status quo, or by nudging it from one kind of bluntness to another.

The steady resistance he felt as he ran told Jamil that he was driving the transition, unblocked, but he searched in vain for some visible sign of success. When he reached a vantage point where he could take in enough of the field in one glance to judge the spectrum properly, he noticed a rapidly vibrating shimmer across the width of the wave. He counted nine peaks: good parity. Margit had pulled most of the amplitude straight out of his spoiler mode and fed it into *this*. It was a mad waste of energy to aim for such an elevated harmonic, but no one had been looking there, no one had stopped her.

The scoring pattern was forming again, he only had nine or ten seconds left to make up for all the time he'd wasted. Jamil chose the strongest good-parity mode in his territory, and the emptiest bad one, computed the velocity that would link them, and ran.

He didn't dare turn to watch the opposition goal; he didn't want to break his concentration. The wave retreated around his feet, less like an Earthly ebb tide than an ocean drawn into the sky by a passing black hole. The city diligently portrayed the shadow that his body would have cast, shrinking in front of him as the tower of light rose.

The verdict was announced. "Fifty point one."

The air was filled with shouts of triumph — Ezequiel's the loudest, as always. Jamil sagged to his knees, laughing. It was a curious feeling, familiar as it was: he cared, and he didn't. If he'd been wholly indifferent to the outcome of the game there would have been no pleasure in it, but obsessing over every defeat — or every victory — could ruin it just as thoroughly. He could almost see himself walking the line, orchestrating his response as carefully as any action in the game itself.

He lay down on the grass to catch his breath before play resumed. The outer face of the microsun that orbited Laplace was shielded with rock, but light reflected skywards from the land beneath it crossed the 100,000 kilometre width of the 3-toroidal universe to give a faint glow to the planet's night side. Though only a sliver was lit directly, Jamil could discern the full disk of the opposite hemisphere in the primary image at the zenith: continents and oceans that lay, by a shorter route, 12,000 or so kilometres beneath him. Other views in the lattice of images spread across the sky were from different angles, and showed substantial crescents of the dayside itself. The one thing you couldn't find in any of these images, even with a telescope, was your own city. The topology of this universe let you see the back of your head, but never your reflection.

Jamil's team lost, three nil. He staggered over to the fountains at the edge of the field and slaked his thirst, shocked by the pleasure of the simple act. Just to be alive was glorious now, but once he felt this way, anything seemed possible. He was back in synch, back in phase, and he was going to make the most of it, for however long it lasted.

He caught up with the others, who'd headed down towards the river. Ezequiel hooked an arm around his neck, laughing. "Bad luck, Sleeping Beauty! You picked the wrong time to wake. With Margit, we're invincible."

Jamil ducked free of him. "I won't argue with that." He looked around. "Speaking of whom —"

Penina said, "Gone home. She plays, that's all. No frivolous socialising after the match."

Chusok added, "Or any other time." Penina shot Jamil a glance that meant: not for want of trying on Chusok's part.

Jamil pondered this, wondering why it annoyed him so much. On the field, she hadn't come across as aloof and superior. Just unashamedly good.

He queried the city, but she'd published nothing besides her name. Nobody expected — or wished — to hear more than the tiniest fraction of another person's history, but it was rare for anyone to start a new life without carrying through something from the old as a kind of calling card, some incident or achievement from which your new neighbours could form an impression of you.

They'd reached the riverbank. Jamil pulled his shirt over his head. “So what's her story? She must have told you something.”

Ezequiel said, “Only that she learnt to play a long time ago; she won't say where or when. She arrived in Noether at the end of last year, and grew a house on the southern outskirts. No one sees her around much. No one even knows what she studies.”

Jamil shrugged, and waded in. “Ah well. It's a challenge to rise to.” Penina laughed and splashed him teasingly. He protested, “I *meant* beating her at the game.”

Chusok said wryly, “When you turned up, I thought you'd be our secret weapon. The one player she didn't know inside out already.”

“I'm glad you didn't tell me that. I would have turned around and fled straight back into hibernation.”

“I know. That's why we all kept quiet.” Chusok smiled. “Welcome back.”

Penina said, “Yeah, welcome back, Jamil.”

Sunlight shone on the surface of the river. Jamil ached all over, but the cool water was the perfect place to be. If he wished, he could build a partition in his mind at the point where he stood right now, and never fall beneath it. Other people lived that way, and it seemed to cost them nothing. Contrast was overrated; no sane person spent half their time driving spikes into their flesh for the sake of feeling better when they stopped. Ezequiel lived every day with the happy boisterousness of a five-year-old; Jamil sometimes found this annoying, but then any kind of disposition would irritate someone. His own stretches of meaningless sombreness weren't exactly a boon to his friends.

Chusok said, “I've invited everyone to a meal at my house tonight. Will you come?”

Jamil thought it over, then shook his head. He still wasn't ready. He couldn't force-feed himself with normality; it didn't speed his recovery, it just drove him backwards.

Chusok looked disappointed, but there was nothing to be done about that. Jamil promised him, “Next time. OK?”

Ezequiel sighed. “What are we going to do with you? You're worse than Margit!” Jamil started backing away, but it was too late. Ezequiel reached him in two casual strides, bent down and grabbed him around the waist, hoisted him effortlessly onto one shoulder, then flung him through the air into the depths of the river.

Jamil was woken by the scent of wood smoke. His room was still filled with the night's grey shadows, but when he propped himself up on one elbow and the window obliged him with transparency, the city was etched clearly in the predawn light.

He dressed and left the house, surprised at the coolness of the dew on his feet. No one else in his street seemed to be up; had they failed to notice the smell, or did they already know to expect it? He turned a

corner and saw the rising column of soot, faintly lit with red from below. The flames and the ruins were still hidden from him, but he knew whose house it was.

When he reached the dying blaze, he crouched in the heat-withered garden, cursing himself. Chusok had offered him the chance to join him for his last meal in Noether. Whatever hints you dropped, it was customary to tell no one that you were moving on. If you still had a lover, if you still had young children, you never deserted them. But friends, you warned in subtle ways. Before vanishing.

Jamil covered his head with his arms. He'd lived through this countless times before, but it never became easier. If anything it grew worse, as every departure was weighted with the memories of others. His brothers and sisters had scattered across the branches of the New Territories. He'd walked away from his father and mother when he was too young and confident to realise how much it would hurt him, decades later. His own children had all abandoned him eventually, far more often than he'd left them. It was easier to leave an ex-lover than a grown child: something burned itself out in a couple, almost naturally, as if ancestral biology had prepared them for at least that one rift.

Jamil stopped fighting the tears. But as he brushed them away, he caught sight of someone standing beside him. He looked up. It was Margit.

He felt a need to explain. He rose to his feet and addressed her. "This was Chusok's house. We were good friends. I'd known him for ninety-six years."

Margit gazed back at him neutrally. "Boo hoo. Poor baby. You'll never see your friend again."

Jamil almost laughed, her rudeness was so surreal. He pushed on, as if the only conceivable, polite response was to pretend that he hadn't heard her. "No one is the kindest, the most generous, the most loyal. It doesn't matter. That's not the point. Everyone's unique. Chusok was Chusok." He banged a fist against his chest, utterly heedless now of her contemptuous words. "There's a hole in me, and it will never be filled." That was the truth, even though he'd grow around it. *He should have gone to the meal, it would have cost him nothing.*

"You must be a real emotional Swiss cheese," observed Margit tartly.

Jamil came to his senses. "Why don't you fuck off to some other universe? No one wants you in Noether."

Margit was amused. "You *are* a bad loser."

Jamil gazed at her, honestly confused for a moment; the game had slipped his mind completely. He gestured at the embers. "What are you doing here? Why did you follow the smoke, if it wasn't regret at not saying goodbye to him when you had the chance?" He wasn't sure how seriously to take Penina's light-hearted insinuation, but if Chusok had fallen for Margit, and it had not been reciprocated, that might even have been the reason he'd left.

She shook her head calmly. "He was nothing to me. I barely spoke to him."

"Well, that's your loss."

"From the look of things, I'd say the loss was all yours."

He had no reply. Margit turned and walked away.

Jamil crouched on the ground again, rocking back and forth, waiting for the pain to subside.

Jamil spent the next week preparing to resume his studies. The library had near-instantaneous contact with every artificial universe in the New Territories, and the additional lightspeed lag between Earth and the point in space from which the whole tree-structure blossomed was only a few hours. Jamil had been to Earth, but only as a tourist; land was scarce, they accepted no migrants. There were remote planets you could live on, in the home universe, but you had to be a certain kind of masochistic purist to want that. The precise reasons why his ancestors had entered the New Territories had been forgotten generations before — and it would have been presumptuous to track them down and ask them in person — but given a choice between the then even-more-crowded Earth, the horrifying reality of interstellar distances, and an endlessly extensible branching chain of worlds which could be traversed within a matter of weeks, the decision wasn't exactly baffling.

Jamil had devoted most of his time in Noether to studying the category of representations of Lie groups on complex vector spaces — a fitting choice, since Emmy Noether had been a pioneer of group theory, and if she'd lived to see this field blossom she would probably have been in the thick of it herself. Representations of Lie groups lay behind most of physics: each kind of subatomic particle was really nothing but a particular way of representing the universal symmetry group as a set of rotations of complex vectors. Organising this kind of structure with category theory was ancient knowledge, but Jamil didn't care; he'd long ago reconciled himself to being a student, not a discoverer. The greatest gift of consciousness was the ability to take the patterns of the world inside you, and for all that he would have relished the thrill of being the first at anything, with ten-to-the-sixteenth people alive that was a futile ambition for most.

In the library, he spoke with fellow students of his chosen field on other worlds, or read their latest works. Though they were not researchers, they could still put a new pedagogical spin on old material, enriching the connections with other fields, finding ways to make the complex, subtle truth easier to assimilate without sacrificing the depth and detail that made it worth knowing in the first place. They would not advance the frontiers of knowledge. They would not discover new principles of nature, or invent new technologies. But to Jamil, understanding was an end in itself.

He rarely thought about the prospect of playing another match, and when he did the idea was not appealing. With Chusok gone, the same group could play ten-to-a-side without Jamil to skew the numbers. Margit might even choose to swap teams, if only for the sake of proving that her current team's monotonous string of victories really had been entirely down to her.

When the day arrived, though, he found himself unable to stay away. He turned up intending to remain a spectator, but Ryuichi had deserted Ezequiel's team, and everyone begged Jamil to join in.

As he took his place opposite Margit, there was nothing in her demeanour to acknowledge their previous encounter: no lingering contempt, but no hint of shame either. Jamil resolved to put it out of his mind; he owed it to his fellow players to concentrate on the game.

They lost, five nil.

Jamil forced himself to follow everyone to Eudore's house, to celebrate, commiserate, or as it turned out, to forget the whole thing. After they'd eaten, Jamil wandered from room to room, enjoying Eudore's choice of music but unable to settle into any conversation. No one mentioned Chusok in his hearing.

He left just after midnight. Laplace's near-full primary image and its eight brightest gibbous companions lit the streets so well that there was no need for anything more. Jamil thought: Chusok might have merely travelled to another city, one beneath his gaze right now. And wherever he'd gone, he might yet choose to stay in touch with his friends from Noether.

And his friends from the next town, and the next?

Century after century?

Margit was sitting on Jamil's doorstep, holding a bunch of white flowers in one hand.

Jamil was irritated. "What are you doing here?"

"I came to apologise."

He shrugged. "There's no need. We feel differently about certain things. That's fine. I can still face you on the playing field."

"I'm not apologising for a difference of opinion. I wasn't honest with you. I was cruel." She shaded her eyes against the glare of the planet and looked up at him. "You were right: it was my loss. I wish I'd known your friend."

He laughed curtly. "Well, it's too late for that."

She said simply, "I know."

Jamil relented. "Do you want to come in?" Margit nodded, and he instructed the door to open for her. As he followed her inside, he said, "How long have you been here? Have you eaten?"

"No."

"I'll cook something for you."

"You don't have to do that."

He called out to her from the kitchen, "Think of it as a peace offering. I don't have any flowers."

Margit replied, "They're not for you. They're for Chusok's house."

Jamil stopped rummaging through his vegetable bins, and walked back into the living room. "People don't usually do that in Noether."

Margit was sitting on the couch, staring at the floor. She said, "I'm so lonely here. I can't bear it any more."

He sat beside her. "Then why did you rebuff him? You could at least have been friends."

She shook her head. "Don't ask me to explain."

Jamil took her hand. She turned and embraced him, trembling miserably. He stroked her hair. "Sssh."

She said, "Just sex. I don't want anything more."

He groaned softly. "There's no such thing as that."

"I just need someone to touch me again."

"I understand." He confessed, "So do I. But that won't be all. So don't ask me to promise there'll be nothing more."

Margit took his face in her hands and kissed him. Her mouth tasted of wood smoke.

Jamil said, "I don't even know you."

"No one knows anyone, any more."

"That's not true."

"No, it's not," she conceded gloomily. She ran a hand lightly along his arm. Jamil wanted badly to see her smile, so he made each dark hair thicken and blossom into a violet flower as it passed beneath her fingers.

She did smile, but she said, "I've seen that trick before."

Jamil was annoyed. "I'm sure to be a disappointment all round, then. I expect you'd be happier with some kind of novelty. A unicorn, or an amoeba."

She laughed. "I don't think so." She took his hand and placed it against her breast. "Do you ever get tired of sex?"

"Do you ever get tired of breathing?"

"I can go for a long time without thinking about it."

He nodded. "But then one day you stop and fill your lungs with air, and it's still as sweet as ever."

Jamil didn't know what he was feeling any more. Lust. Compassion. Spite. She'd come to him hurting, and he wanted to help her, but he wasn't sure that either of them really believed this would work.

Margit inhaled the scent of the flowers on his arm. "Are they the same colour? Everywhere else?"

He said, "There's only one way to find out."

Jamil woke in the early hours of the morning, alone. He'd half expected Margit to flee like this, but she could have waited till dawn. He would have obligingly feigned sleep while she dressed and tip-toed out.

Then he heard her. It was not a sound he would normally have associated with a human being, but it could not have been anything else.

He found her in the kitchen, curled around a table leg, wailing rhythmically. He stood back and watched her, afraid that anything he did would only make things worse. She met his gaze in the half light, but kept up the mechanical whimper. Her eyes weren't blank; she was not delirious, or hallucinating. She knew exactly who, and where, she was.

Finally, Jamil knelt in the doorway. He said, "Whatever it is, you can tell me. And we'll fix it. We'll find a way."

She bared her teeth. "You can't *fix it*, you stupid child." She resumed the awful noise.

"Then just tell me. Please?" He stretched out a hand towards her. He hadn't felt quite so helpless since his very first daughter, Aminata, had come to him as an inconsolable six-year-old, rejected by the boy to whom she'd declared her undying love. He'd been twenty-four years old; a child himself. More than a thousand years ago. *Where are you now, Nata?*

Margit said, "I promised. I'd never tell."

"Promised who?"

“Myself.”

“Good. They're the easiest kind to break.”

She started weeping. It was a more ordinary sound, but it was even more chilling. She was not a wounded animal now, an alien being suffering some incomprehensible pain. Jamil approached her cautiously; she let him wrap his arms around her shoulders.

He whispered, “Come to bed. The warmth will help. Just being held will help.”

She spat at him derisively, “It won't bring her back.”

“Who?”

Margit stared at him in silence, as if he'd said something shocking.

Jamil insisted gently, “Who won't it bring back?” She'd lost a friend, badly, the way he'd lost Chusok. That was why she'd sought him out. He could help her through it. They could help each other through it.

She said, “It won't bring back the dead.”

Margit was seven thousand five hundred and ninety-four years old. Jamil persuaded her to sit at the kitchen table. He wrapped her in blankets, then fed her tomatoes and rice, as she told him how she'd witnessed the birth of his world.

The promise had shimmered just beyond reach for decades. Almost none of her contemporaries had believed it would happen, though the truth should have been plain for centuries: *the human body was a material thing*. In time, with enough knowledge and effort, it would become possible to safeguard it from any kind of deterioration, any kind of harm. Stellar evolution and cosmic entropy might or might not prove insurmountable, but there'd be aeons to confront those challenges. In the middle of the twenty-first century, the hurdles were aging, disease, violence, and an overcrowded planet.

“Grace was my best friend. We were students.” Margit smiled. “Before everyone was a student. We'd talk about it, but we didn't believe we'd see it happen. It would come in another century. It would come for our great-great-grandchildren. We'd hold infants on our knees in our twilight years and tell ourselves: *this one will never die*.”

“When we were both twenty-two, something happened. To both of us.” She lowered her eyes. “We were kidnapped. We were raped. We were tortured.”

Jamil didn't know how to respond. These were just words to him: he knew their meaning, he knew these acts would have hurt her, but she might as well have been describing a mathematical theorem. He stretched a hand across the table, but Margit ignored it. He said awkwardly, “This was ... the Holocaust?”

She looked up at him, shaking her head, almost laughing at his naivete. “Not even one of them. Not a war, not a pogrom. Just one psychopathic man. He locked us in his basement, for six months. He'd killed seven women.” Tears began spilling down her cheeks. “He showed us the bodies. They were buried right where we slept. He showed us how we'd end up, when he was through with us.”

Jamil was numb. He'd known all his adult life what had once been possible — what had once happened, to real people — but it had all been consigned to history long before his birth. In retrospect it seemed almost inconceivably stupid, but he'd always imagined that the changes had come in such a way that no one still living had experienced these horrors. There'd been no escaping the bare minimum, the logical

necessity: his oldest living ancestors must have watched their parents fall peacefully into eternal sleep. But not this. Not a flesh-and-blood woman, sitting in front of him, who'd been forced to sleep in a killer's graveyard.

He put his hand over hers, and choked out the words. "This man ... *killed* Grace? He killed your friend?"

Margit began sobbing, but she shook her head. "No, no. We got out!" She twisted her mouth into a smile. "Someone stabbed the stupid fucker in a bar-room brawl. We dug our way out while he was in hospital." She put her face down on the table and wept, but she held Jamil's hand against her cheek. He couldn't understand what she'd lived through, but that didn't mean he couldn't console her. Hadn't he touched his mother's face the same way, when she was sad beyond his childish comprehension?

She composed herself, and continued. "We made a resolution, while we were in there. If we survived, there'd be no more empty promises. No more day dreams. What he'd done to those seven women — and what he'd done to us — would become impossible."

And it had. Whatever harm befell your body, you had the power to shut off your senses and decline to experience it. If the flesh was damaged, it could always be repaired or replaced. In the unlikely event that your jewel itself was destroyed, everyone had backups, scattered across universes. No human being could inflict physical pain on another. In theory, you could still be killed, but it would take the same kind of resources as destroying a galaxy. The only people who seriously contemplated either were the villains in very bad operas.

Jamil's eyes narrowed in wonder. She'd spoken those last words with such fierce pride that there was no question of her having failed.

"*You* are Ndoli? You invented the jewel?" As a child, he'd been told that the machine in his skull had been designed by a man who'd died long ago.

Margit stroked his hand, amused. "In those days, very few Hungarian women could be mistaken for Nigerian men. I've never changed my body that much, Jamil. I've always looked much as you see me."

Jamil was relieved; if she'd been Ndoli himself, he might have succumbed to sheer awe and started babbling idolatrous nonsense. "But you worked with Ndoli? You and Grace?"

She shook her head. "We made the resolution, and then we floundered. We were mathematicians, not neurologists. There were a thousand things going on at once: tissue engineering, brain imaging, molecular computers. We had no real idea where to put our efforts, which problems we should bring our strengths to bear upon. Ndoli's work didn't come out of the blue for us, but we played no part in it.

"For a while, almost everyone was nervous about switching from the brain to the jewel. In the early days, the jewel was a separate device that learned its task by mimicking the brain, and it had to be handed control of the body at one chosen moment. It took another fifty years before it could be engineered to replace the brain incrementally, neuron by neuron, in a seamless transition throughout adolescence."

So Grace had lived to see the jewel invented, but held back, and died before she could use it? Jamil kept himself from blurting out this conclusion; all his guesses had proved wrong so far.

Margit continued. "Some people weren't just nervous, though. You'd be amazed how vehemently Ndoli was denounced in certain quarters. And I don't just mean the fanatics who churned out paranoid tracts about 'the machines' taking over, with their evil inhuman agendas. Some people's antagonism had nothing

to do with the specifics of the technology. They were opposed to immortality, in principle.”

Jamil laughed. “*Why?*”

“Ten thousand years' worth of sophistry doesn't vanish overnight,” Margit observed dryly. “Every human culture had expended vast amounts of intellectual effort on the problem of coming to terms with death. Most religions had constructed elaborate lies about it, making it out to be something other than it was — though a few were dishonest about life, instead. But even most secular philosophies were warped by the need to pretend that *death was for the best*.”

“It was the naturalistic fallacy at its most extreme — and its most transparent, but that didn't stop anyone. Since any child could tell you that death was meaningless, contingent, unjust, and abhorrent beyond words, it was a hallmark of sophistication to believe otherwise. Writers had consoled themselves for centuries with smug puritanical fables about immortals who'd long for death — who'd *beg* for death. It would have been too much to expect all those who were suddenly faced with the reality of its banishment to confess that they'd been whistling in the dark. And would-be moral philosophers — mostly those who'd experienced no greater inconvenience in their lives than a late train or a surly waiter — began wailing about the destruction of the human spirit by this hideous blight. We needed death and suffering, to put steel into our souls! Not horrible, horrible *freedom and safety!*”

Jamil smiled. “So there were buffoons. But in the end, surely they swallowed their pride? If we're walking in a desert and I tell you that the lake you see ahead is a mirage, I might cling stubbornly to my own belief, to save myself from disappointment. But when we arrive, and I'm proven wrong, I *will* drink from the lake.”

Margit nodded. “Most of the loudest of these people went quiet in the end. But there were subtler arguments, too. Like it or not, all our biology and all of our culture *had* evolved in the presence of death. And almost every righteous struggle in history, every worthwhile sacrifice, had been against suffering, against violence, against death. Now, that struggle would become impossible.”

“Yes.” Jamil was mystified. “But only because it had triumphed.”

Margit said gently, “I know. There was no sense to it. And it was always my belief that anything worth fighting for — over centuries, over millennia — was worth attaining. It *can't* be noble to toil for a cause, and even to die for it, unless it's also noble to succeed. To claim otherwise isn't sophistication, it's just a kind of hypocrisy. If it's better to travel than arrive, you shouldn't start the voyage in the first place.

“I told Grace as much, and she agreed. We laughed together at what we called the *tragedians*: the people who denounced the coming age as the age without martyrs, the age without saints, the age without revolutionaries. There would never be another Gandhi, another Mandela, another Aung San Suu Kyi — and yes, that *was* a kind of loss, but would any great leader have sentenced humanity to eternal misery, for the sake of providing a suitable backdrop for eternal heroism? Well, some of them would have. But the down-trodden themselves had better things to do.”

Margit fell silent. Jamil cleared her plate away, then sat opposite her again. It was almost dawn.

“Of course, the jewel was not enough,” Margit continued. “With care, Earth could support forty billion people, but where would the rest go? The jewel made virtual reality the easiest escape route: for a fraction of the space, a fraction of the energy, it could survive without a body attached. Grace and I weren't horrified by that prospect, the way some people were. But it was not the best outcome, it was not what most people wanted, they way they wanted freedom from death.

“So we studied gravity, we studied the vacuum.”

Jamil feared making a fool of himself again, but from the expression on her face he knew he wasn't wrong this time. *M. Osvát and G. Füst*. Co-authors of the seminal paper, but no more was known about them than those abbreviated names. “You gave us the New Territories?”

Margit nodded slightly. “Grace and I.”

Jamil was overwhelmed with love for her. He went to her and knelt down to put his arms around her waist. Margit touched his shoulder. “Come on, get up. Don't treat me like a god, it just makes me feel old.”

He stood, smiling abashedly. Anyone in pain deserved his help — but if he was not in her debt, the word had no meaning.

“And Grace?” he asked.

Margit looked away. “Grace completed her work, and then decided that she was a tragedian, after all. Rape was impossible. Torture was impossible. Poverty was vanishing. Death was receding into cosmology, into metaphysics. It was everything she'd hoped would come to pass. And for her, suddenly faced with that fulfilment, everything that remained seemed trivial.

“One night, she climbed into the furnace in the basement of her building. Her jewel survived the flames, but she'd erased it from within.”

It was morning now. Jamil was beginning to feel disoriented; Margit should have vanished in daylight, an apparition unable to persist in the mundane world.

“I'd lost other people who were close to me,” she said. “My parents. My brother. Friends. And so had everyone around me, then. I wasn't special: grief was still commonplace. But decade by decade, century by century, we shrank into insignificance, those of us who knew what it meant to lose someone for ever. We're less than one in a million, now.

“For a long time, I clung to my own generation. There were enclaves, there were ghettos, where everyone understood the old days. I spent two hundred years married to a man who wrote a play called *We Who Have Known the Dead* — which was every bit as pretentious and self-pitying as you'd guess from the title.” She smiled at the memory. “It was a horrible, self-devouring world. If I'd stayed in it much longer, I would have followed Grace. I would have begged for death.”

She looked up at Jamil. “It's people like you I want to be with: *people who don't understand*. Your lives aren't trivial, any more than the best parts of our own were: all the tranquillity, all the beauty, all the happiness that made the sacrifices and the life-and-death struggles worthwhile.

“The tragedians were wrong. They had everything upside-down. Death never gave meaning to life: it was always the other way round. All of its gravitas, all of its significance, was stolen from the things it ended. But the value of life always lay entirely in itself — not in its loss, not in its fragility.

“Grace should have lived to see that. She should have lived long enough to understand that the world hadn't turned to ash.”

Jamil sat in silence, turning the whole confession over in his mind, trying to absorb it well enough not to add to her distress with a misjudged question. Finally, he ventured, “Why do you hold back from friendship with us, though? Because we're just children to you? Children who can't understand what you've lost?”

Margit shook her head vehemently. “I don't *want you* to understand! People like me are the only blight

on this world, the only poison.” She smiled at Jamil’s expression of anguish, and rushed to silence him before he could swear that she was nothing of the kind. “Not in everything we do and say, or everyone we touch: I’m not claiming that we’re tainted, in some fatuous mythological sense. But when I left the ghettos, I promised myself that I wouldn’t bring the past with me. Sometimes that’s an easy vow to keep. Sometimes it’s not.”

“You’ve broken it tonight,” Jamil said plainly. “And neither of us have been struck down by lightning.”

“I know.” She took his hand. “But I was wrong to tell you what I have, and I’ll fight to regain the strength to stay silent. I stand at the border between two worlds, Jamil. I remember death, and I always will. But my job now is to guard that border. To keep that knowledge from invading your world.”

“We’re not as fragile as you think,” he protested. “We all know something about loss.”

Margit nodded soberly. “Your friend Chusok has vanished into the crowd. That’s how things work now: how you keep yourselves from suffocating in a jungle of endlessly growing connections, or fragmenting into isolated troupes of repertory players, endlessly churning out the same lines.

“You have your little deaths — and I don’t call them that to deride you. But I’ve seen both. And I promise you, they’re not the same.”

In the weeks that followed, Jamil resumed in full the life he’d made for himself in Noether. Five days in seven were for the difficult beauty of mathematics. The rest were for his friends.

He kept playing matches, and Margit’s team kept winning. In the sixth game, though, Jamil’s team finally scored against her. Their defeat was only three to one.

Each night, Jamil struggled with the question. What exactly did he owe her? Eternal loyalty, eternal silence, eternal obedience? She hadn’t sworn him to secrecy; she’d extracted no promises at all. But he knew she was trusting him to comply with her wishes, so what right did he have to do otherwise?

Eight weeks after the night he’d spent with Margit, Jamil found himself alone with Penina in a room in Joracy’s house. They’d been talking about the old days. Talking about Chusok.

Jamil said, “Margit lost someone, very close to her.”

Penina nodded matter-of-factly, but curled into a comfortable position on the couch and prepared to take in every word.

“Not in the way we’ve lost Chusok. Not in the way you think at all.”

Jamil approached the others, one by one. His confidence ebbed and flowed. He’d glimpsed the old world, but he couldn’t pretend to have fathomed its inhabitants. What if Margit saw this as worse than betrayal — as a further torture, a further rape?

But he couldn’t stand by and leave her to the torture she’d inflicted on herself.

Ezequiel was the hardest to face. Jamil spent a sick and sleepless night beforehand, wondering if this would make him a monster, a corrupter of children, the epitome of everything Margit believed she was fighting.

Ezequiel wept freely, but he was not a child. He was older than Jamil, and he had more steel in his soul than any of them.

He said, “I guessed it might be that. I guessed she might have seen the bad times. But I never found a

way to ask her.”

The three lobes of probability converged, melted into a plateau, rose into a pillar of light.

The umpire said, “Fifty-five point nine.” It was Margit's most impressive goal yet.

Ezequiel whooped joyfully and ran towards her. When he scooped her up in his arms and threw her across his shoulders, she laughed and indulged him. When Jamil stood beside him and they made a joint throne for her with their arms, she frowned down at him and said, “You shouldn't be doing this. You're on the losing side.”

The rest of the players converged on them, cheering, and they started down towards the river. Margit looked around nervously. “What is this? We haven't finished playing.”

Penina said, “The game's over early, just this once. Think of this as an invitation. We want you to swim with us. We want you to talk to us. We want to hear everything about your life.”

Margit's composure began to crack. She squeezed Jamil's shoulder. He whispered, “Say the word, and we'll put you down.”

Margit didn't whisper back; she shouted miserably, “What do you want from me, you parasites? I've won your fucking game for you! What more do you want?”

Jamil was mortified. He stopped and prepared to lower her, prepared to retreat, but Ezequiel caught his arm.

Ezequiel said, “We want to be your border guards. We want to stand beside you.”

Christa added, “We can't face what you've faced, but we want to understand. As much as we can.”

Joracy spoke, then Yann, Narcyza, Maria, Halide. Margit looked down on them, weeping, confused.

Jamil burnt with shame. He'd hijacked her, humiliated her. He'd made everything worse. She'd flee Noether, flee into a new exile, more alone than ever.

When everyone had spoken, silence descended. Margit trembled on her throne.

Jamil faced the ground. He couldn't undo what he'd done. He said quietly, “Now you know our wishes. Will you tell us yours?”

“Put me down.”

Jamil and Ezequiel complied.

Margit looked around at her teammates and opponents, her children, her creation, her would-be friends.

She said, “I want to go to the river with you. I'm seven thousand years old, and I want to learn to swim.”