

# Riding the Crocodile

by Greg Egan

This story is set in the same universe as the novel *Incandescence*, some 300,000 years before Rakesh's journey to the bulge. It is not a part of the novel itself. Copyright © Greg Egan, 2005. All rights reserved.

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## 1

In their ten-thousand, three hundred and ninth year of marriage, Leila and Jasim began contemplating death. They had known love, raised children, and witnessed the flourishing generations of their offspring. They had travelled to a dozen worlds and lived among a thousand cultures. They had educated themselves many times over, proved theorems, and acquired and abandoned artistic sensibilities and skills. They had not lived in every conceivable manner, far from it, but what room would there be for the multitude if each individual tried to exhaust the permutations of existence? There were some experiences, they agreed, that everyone should try, and others that only a handful of people in all of time need bother with. They had no wish to give up their idiosyncrasies, no wish to uproot their personalities from the niches they had settled in long ago, let alone start cranking mechanically through some tedious enumeration of all the other people they might have been. They had been themselves, and for that they had done, more or less, enough.

Before dying, though, they wanted to attempt something grand and audacious. It was not that their lives were incomplete, in need of some final flourish of affirmation. If some unlikely calamity had robbed them of the chance to orchestrate this finale, the closest of their friends would never have remarked upon, let alone mourned, its absence. There was no aesthetic compulsion to be satisfied, no aching existential void to be filled. Nevertheless, it was what they both wanted, and once they had acknowledged this to each other their hearts were set on it.

Choosing the project was not a great burden; that task required nothing but patience. They knew they'd recognise it when it came to them. Every night before sleeping, Jasim would ask Leila, "Did you see it yet?"

"No. Did you?"

"Not yet."

Sometimes Leila would dream that she'd found it in her dreams, but the transcripts proved otherwise. Sometimes Jasim felt sure that it was lurking just below the surface of his thoughts, but when he dived down to check it was nothing but a trick of the light.

Years passed. They occupied themselves with simple pleasures: gardening, swimming in the surf, talking with their friends, catching up with their descendants. They had grown skilled at finding pastimes that could bear repetition. Still, were it not for the nameless adventure that awaited them they would have thrown a pair of dice each evening and agreed that two sixes would end it all.

One night, Leila stood alone in the garden, watching the sky. From their home world, Najib, they had travelled only to the nearest stars with inhabited worlds, each time losing just a few decades to the journey. They had chosen those limits so as not to alienate themselves from friends and family, and it had never felt like much of a constraint. True, the civilisation of the Amalgam wrapped the galaxy, and a committed traveller could spend two hundred thousand years circling back home, but what was to be gained by such an overblown odyssey? The dozen worlds of their neighbourhood held enough variety for

any traveller, and whether more distant realms were filled with fresh novelties or endless repetition hardly seemed to matter. To have a goal, a destination, would be one thing, but to drown in the sheer plenitude of worlds for its own sake seemed utterly pointless.

A destination? Leila overlaid the sky with information, most of it by necessity millennia out of date. There were worlds with spectacular views of nebulas and star clusters, views that could be guaranteed still to be in existence if they travelled to see them, but would taking in such sights firsthand be so much better than immersion in the flawless images already available in Najib's library? To blink away ten thousand years just to wake beneath a cloud of green and violet gas, however lovely, seemed like a terrible anticlimax.

The stars tingled with self-aggrandisement, plaintively tugging at her attention. The architecture here, the rivers, the festivals! Even if these tourist attractions could survive the millennia, even if some were literally unique, there was nothing that struck her as a fitting prelude to death. If she and Jasim had formed some whimsical attachment, centuries before, to a world on the other side of the galaxy rumoured to hold great beauty or interest, and if they had talked long enough about chasing it down when they had nothing better to do, then keeping that promise might have been worth it, even if the journey led them to a world in ruins. They had no such cherished destination, though, and it was too late to cultivate one now.

Leila's gaze followed a thinning in the advertising, taking her to the bulge of stars surrounding the galaxy's centre. The disk of the Milky Way belonged to the Amalgam, whose various ancestral species had effectively merged into a single civilisation, but the central bulge was inhabited by beings who had declined to do so much as communicate with those around them. All attempts to send probes into the bulge — let alone the kind of engineering spores needed to create the infrastructure for travel — had been gently but firmly rebuffed, with the intruders swatted straight back out again. The Aloof had maintained their silence and isolation since before the Amalgam itself had even existed.

The latest news on this subject was twenty thousand years old, but the status quo had held for close to a million years. If she and Jasim travelled to the innermost edge of the Amalgam's domain, the chances were exceptionally good that the Aloof would not have changed their ways in the meantime. In fact, it would be no disappointment at all if the Aloof had suddenly thrown open their borders: that unheralded thaw would itself be an extraordinary thing to witness. If the challenge remained, though, all the better.

She called Jasim to the garden and pointed out the richness of stars, unadorned with potted histories.

“We go where?” he asked.

“As close to the Aloof as we're able.”

“And do what?”

“Try to observe them,” she said. “Try to learn something about them. Try to make contact, in whatever way we can.”

“You don't think that's been tried before?”

“A million times. Not so much lately, though. Maybe while the interest on our side has ebbed, they've been changing, growing more receptive.”

“Or maybe not.” Jasim smiled. He had appeared a little stunned by her proposal at first, but the idea seemed to be growing on him. “It's a hard, hard problem to throw ourselves against. But it's not futile. Not quite.” He wrapped her hands in his. “Let's see how we feel in the morning.”

In the morning, they were both convinced. They would camp at the gates of these elusive strangers, and try to rouse them from their indifference.

They summoned the family from every corner of Najib. There were some grandchildren and more distant descendants who had settled in other star systems, decades away at lightspeed, but they chose not to wait to call them home for this final farewell.

Two hundred people crowded the physical house and garden, while two hundred more confined themselves to the virtual wing. There was talk and food and music, like any other celebration, and Leila tried to undercut any edge of solemnity that she felt creeping in. As the night wore on, though, each time she kissed a child or grandchild, each time she embraced an old friend, she thought: this could be the last time, ever. There had to be a last time, she couldn't face ten thousand more years, but a part of her spat and struggled like a cornered animal at the thought of each warm touch fading to nothing.

As dawn approached, the party shifted entirely into the acorporeal. People took on fancy dress from myth or xenology, or just joked and played with their illusory bodies. It was all very calm and gentle, nothing like the surreal excesses she remembered from her youth, but Leila still felt a tinge of vertigo. When her son Khalid made his ears grow and spin, this amiable silliness carried a hard message: the machinery of the house had ripped her mind from her body, as seamlessly as ever, but this time she would never be returning to the same flesh.

Sunrise brought the first of the goodbyes. Leila forced herself to release each proffered hand, to unwrap her arms from around each non-existent body. She whispered to Jasim, “Are you going mad, too?”

“Of course.”

Gradually the crowd thinned out. The wing grew quiet. Leila found herself pacing from room to room, as if she might yet chance upon someone who'd stayed behind, then she remembered urging the last of them to go, her children and friends tearfully retreating down the hall. She skirted inconsolable sadness, then lifted herself above it and went looking for Jasim.

He was waiting for her outside their room.

“Are you ready to sleep?” he asked her gently.

She said, “For an eon.”

## 2

Leila woke in the same bed as she'd lain down in. Jasim was still sleeping beside her. The window showed dawn, but it was not the usual view of the cliffs and the ocean.

Leila had the house brief her. After twenty thousand years — travelling more or less at lightspeed, pausing only for a microsecond or two at various way-stations to be cleaned up and amplified — the package of information bearing the two of them had arrived safely at Nazdeek-be-Beegane. This world was not crowded, and it had been tweaked to render it compatible with a range of metabolic styles. The house had negotiated a site where they could live embodied in comfort if they wished.

Jasim stirred and opened his eyes. “Good morning. How are you feeling?”

“Older.”

“Really?”

Leila paused to consider this seriously. “No. Not even slightly. How about you?”

“I’m fine. I’m just wondering what’s out there.” He raised himself up to peer through the window. The house had been instantiated on a wide, empty plain, covered with low stalks of green and yellow vegetation. They could eat these plants, and the house had already started a spice garden while they slept. He stretched his shoulders. “Let’s go and make breakfast.”

They went downstairs, stepping into freshly minted bodies, then out into the garden. The air was still, the sun already warm. The house had tools prepared to help them with the harvest. It was the nature of travel that they had come empty-handed, and they had no relatives here, no fifteenth cousins, no friends of friends. It was the nature of the Amalgam that they were welcome nonetheless, and the machines that supervised this world on behalf of its inhabitants had done their best to provide for them.

“So this is the afterlife,” Jasim mused, scything the yellow stalks. “Very rustic.”

“Speak for yourself,” Leila retorted. “I’m not dead yet.” She put down her own scythe and bent to pluck one of the plants out by its roots.

The meal they made was filling but bland. Leila resisted the urge to tweak her perceptions of it; she preferred to face the challenge of working out decent recipes, which would make a useful counterpoint to the more daunting task they’d come here to attempt.

They spent the rest of the day just tramping around, exploring their immediate surroundings. The house had tapped into a nearby stream for water, and sunlight, stored, would provide all the power they needed. From some hills about an hour’s walk away they could see into a field with another building, but they decided to wait a little longer before introducing themselves to their neighbours. The air had a slightly odd smell, due to the range of components needed to support other metabolic styles, but it wasn’t too intrusive.

The onset of night took them by surprise. Even before the sun had set a smattering of stars began appearing in the east, and for a moment Leila thought that these white specks against the fading blue were some kind of exotic atmospheric phenomenon, perhaps small clouds forming in the stratosphere as the temperature dropped. When it became clear what was happening, she beckoned to Jasim to sit beside her on the bank of the stream and watch the stars of the bulge come out.

They’d come at a time when Nazdeek lay between its sun and the galactic centre. At dusk one half of the Aloof’s dazzling territory stretched from the eastern horizon to the zenith, with the stars’ slow march westward against a darkening sky only revealing more of their splendour.

“You think that was to die for?” Jasim joked as they walked back to the house.

“We could end this now, if you’re feeling unambitious.”

He squeezed her hand. “If this takes ten thousand years, I’m ready.”

It was a mild night, they could have slept outdoors, but the spectacle was too distracting. They stayed downstairs, in the physical wing. Leila watched the strange thicket of shadows cast by the furniture sliding across the walls. These neighbours never sleep, she thought. When we come knocking, they’ll ask what took us so long.

### 3

Hundreds of observatories circled Nazdeek, built then abandoned by others who’d come on the same

quest. When Leila saw the band of pristine space junk mapped out before her — orbits scrupulously maintained and swept clean by robot sentinels for eons — she felt as if she'd found the graves of their predecessors, stretching out in the field behind the house as far as the eye could see.

Nazdeek was prepared to offer them the resources to loft another package of instruments into the vacuum if they wished, but many of the abandoned observatories were perfectly functional, and most had been left in a compliant state, willing to take instructions from anyone.

Leila and Jasim sat in their living room and woke machine after machine from millennia of hibernation. Some, it turned out, had not been sleeping at all, but had been carrying on systematic observations, accumulating data long after their owners had lost interest.

In the crowded stellar precincts of the bulge, disruptive gravitational effects made planet formation rarer than it was in the disk, and orbits less stable. Nevertheless, planets had been found. A few thousand could be tracked from Nazdeek, and one observatory had been monitoring their atmospheric spectra for the last twelve millennia. In all of those worlds for all of those years, there were no signs of atmospheric composition departing from plausible, purely geochemical models. That meant no wild life, and no crude industries. It didn't prove that these worlds were uninhabited, but it suggested either that the Aloof went to great lengths to avoid leaving chemical fingerprints, or they lived in an entirely different fashion to any of the civilisations that had formed the Amalgam.

Of the eleven forms of biochemistry that had been found scattered around the galactic disk, all had given rise eventually to hundreds of species with general intelligence. Of the multitude of civilisations that had emerged from those roots, all contained cultures that had granted themselves the flexibility of living as software, but they also all contained cultures that persisted with corporeal existence. Leila would never have willingly given up either mode, herself, but while it was easy to imagine a subculture doing so, for a whole species it seemed extraordinary. In a sense, the intertwined civilisation of the Amalgam owed its existence to the fact that there was as much cultural variation within every species as there was between one species and another. In that explosion of diversity, overlapping interests were inevitable.

If the Aloof were the exception, and their material culture had shrunk to nothing but a few discreet processors — each with the energy needs of a gnat, scattered throughout a trillion cubic light years of dust and blazing stars — then finding them would be impossible.

Of course, that worst-case scenario couldn't quite be true. The sole reason the Aloof were assumed to exist at all was the fact that some component of their material culture was tossing back every probe that was sent into the bulge. However discreet that machinery was, it certainly couldn't be sparse: given that it had managed to track, intercept and reverse the trajectories of billions of individual probes that had been sent in along thousands of different routes, relativistic constraints on the information flow implied that the Aloof had some kind of presence at more or less every star at the edge of the bulge.

Leila and Jasim had Nazdeek brief them on the most recent attempts to enter the bulge, but even after forty thousand years the basic facts hadn't changed. There was no crisply delineated barrier marking the Aloof's territory, but at some point within a border region about fifty light years wide, every single probe that was sent in ceased to function. The signals from those carrying in-flight beacons or transmitters went dead without warning. A century or so later, they would appear again at almost the same point, travelling in the opposite direction: back to where they'd come from. Those that were retrieved and examined were found to be unharmed, but their data logs contained nothing from the missing decades.

Jasim said, "The Aloof could be dead and gone. They built the perfect fence, but now it's outlasted them. It's just guarding their ruins."

Leila rejected this emphatically. “No civilisation that's spread to more than one star system has ever vanished completely. Sometimes they've changed beyond recognition, but not one has ever died without descendants.”

“That's a fact of history, but it's not a universal law,” Jasim persisted. “If we're going to argue from the Amalgam all the time, we'll get nowhere. If the Aloof weren't exceptional, we wouldn't be here.”

“That's true. But I won't accept that they're dead until I see some evidence.”

“What would count as evidence? Apart from a million years of silence?”

Leila said, “Silence could mean anything. If they're really dead, we'll find something more, something definite.”

“Such as?”

“If we see it, we'll know.”

They began the project in earnest, reviewing data from the ancient observatories, stopping only to gather food, eat and sleep. They had resisted making detailed plans back on Najib, reasoning that any approach they mapped out in advance was likely to be rendered obsolete once they learned about the latest investigations. Now that they'd arrived and found the state of play utterly unchanged, Leila wished that they'd come armed with some clear options for dealing with the one situation they could have prepared for before they'd left.

In fact, though they might have felt like out-of-touch amateurs back on Najib, now that the Aloof had become their entire *raison d'être* it was far harder to relax and indulge in the kind of speculation that might actually bear fruit, given that every systematic approach had failed. Having come twenty thousand light years for this, they couldn't spend their time day-dreaming, turning the problem over in the backs of their minds while they surrendered to the rhythms of Nazdeek's rural idyll. So they studied everything that had been tried before, searching methodically for a new approach, hoping to see the old ideas with fresh eyes, hoping that — by chance if for no other reason — they might lack some crucial blind spot that had afflicted all of their predecessors.

After seven months without results or inspiration, it was Jasim who finally dragged them out of the rut. “We're getting nowhere,” he said. “It's time to accept that, put all this aside, and go visit the neighbours.”

Leila stared at him as if he'd lost his mind. “Go visit them? How? What makes you think that they're suddenly going to let us in?”

He said, “The neighbours. Remember? Over the hill. The ones who might actually want to talk to us.”

#### 4

Their neighbours had published a précis stating that they welcomed social contact in principle, but might take a while to respond. Jasim sent them an invitation, asking if they'd like to join them in their house, and waited.

After just three days, a reply came back. The neighbours did not want to put them to the trouble of altering their own house physically, and preferred not to become acorporeal at present. Given the less stringent requirements of Leila and Jasim's own species when embodied, might they wish to come instead to the neighbours' house?

Leila said, “Why not?” They set a date and time.

The neighbours' précis included all the biological and sociological details needed to prepare for the encounter. Their biochemistry was carbon-based and oxygen-breathing, but employed a different replicator to Leila and Jasim's DNA. Their ancestral phenotype resembled a large furred snake, and when embodied they generally lived in nests of a hundred or so. The minds of the individuals were perfectly autonomous, but solitude was an alien and unsettling concept for them.

Leila and Jasim set out late in the morning, in order to arrive early in the afternoon. There were some low, heavy clouds in the sky, but it was not completely overcast, and Leila noticed that when the sun passed behind the clouds, she could discern some of the brightest stars from the edge of the bulge.

Jasim admonished her sternly, "Stop looking. This is our day off."

The Snakes' building was a large squat cylinder resembling a water tank, which turned out to be packed with something mossy and pungent. When they arrived at the entrance, three of their hosts were waiting to greet them, coiled on the ground near the mouth of a large tunnel emerging from the moss. Their bodies were almost as wide as their guests', and some eight or ten metres long. Their heads bore two front-facing eyes, but their other sense organs were not prominent. Leila could make out their mouths, and knew from the briefing how many rows of teeth lay behind them, but the wide pink gashes stayed closed, almost lost in the grey fur.

The Snakes communicated with a low-frequency thumping, and their system of nomenclature was complex, so Leila just mentally tagged the three of them with randomly chosen, slightly exotic names — Tim, John and Sarah — and tweaked her translator so she'd recognise intuitively who was who, who was addressing her, and the significance of their gestures.

"Welcome to our home," said Tim enthusiastically.

"Thank you for inviting us," Jasim replied.

"We've had no visitors for quite some time," explained Sarah. "So we really are delighted to meet you."

"How long has it been?" Leila asked.

"Twenty years," said Sarah.

"But we came here for the quiet life," John added. "So we expected it would be a while."

Leila pondered the idea of a clan of a hundred ever finding a quiet life, but then, perhaps unwelcome intrusions from outsiders were of a different nature to family dramas.

"Will you come into the nest?" Tim asked. "If you don't wish to enter we won't take offence, but everyone would like to see you, and some of us aren't comfortable coming out into the open."

Leila glanced at Jasim. He said privately, "We can push our vision to IR. And tweak ourselves to tolerate the smell."

Leila agreed.

"Okay," Jasim told Tim.

Tim slithered into the tunnel and vanished in a quick, elegant motion, then John motioned with his head for the guests to follow. Leila went first, propelling herself up the gentle slope with her knees and elbows. The plant the Snakes' cultivated for the nest formed a cool, dry, resilient surface. She could see Tim ten metres or so ahead, like a giant glow-worm shining with body heat, slowing down now to let her catch

up. She glanced back at Jasim, who looked even weirder than the Snakes now, his face and arms blotched with strange bands of radiance from the exertion.

After a few minutes, they came to a large chamber. The air was humid, but after the confines of the tunnel it felt cool and fresh. Tim led them towards the centre, where about a dozen other Snakes were already waiting to greet them. They circled the guests excitedly, thumping out a delighted welcome. Leila felt a surge of adrenaline; she knew that she and Jasim were in no danger, but the sheer size and energy of the creatures was overwhelming.

“Can you tell us why you've come to Nazdeek?” asked Sarah.

“Of course.” For a second or two Leila tried to maintain eye contact with her, but like all the other Snakes she kept moving restlessly, a gesture that Leila's translator imbued with a sense of warmth and enthusiasm. As for lack of eye contact, the Snakes' own translators would understand perfectly that some aspects of ordinary, polite human behaviour became impractical under the circumstances, and would not mislabel her actions. “We're here to learn about the Aloof,” she said.

“The Aloof?” At first Sarah just seemed perplexed, then Leila's translator hinted at a touch of irony. “But they offer us nothing.”

Leila was tongue-tied for a moment. The implication was subtle but unmistakable. Citizens of the Amalgam had a protocol for dealing with each other's curiosity: they published a précis, which spelled out clearly any information that they wished people in general to know about them, and also specified what, if any, further inquiries would be welcome. However, a citizen was perfectly entitled to publish no précis at all and have that decision respected. When no information was published, and no invitation offered, you simply had no choice but to mind your own business.

“They offer us nothing as far as we can tell,” she said, “but that might be a misunderstanding, a failure to communicate.”

“They send back all the probes,” Tim replied. “Do you really think we've misunderstood what that means?”

Jasim said, “It means that they don't want us physically intruding on their territory, putting our machines right next to their homes, but I'm not convinced that it proves that they have no desire to communicate whatsoever.”

“We should leave them in peace,” Tim insisted. “They've seen the probes, so they know we're here. If they want to make contact, they'll do it in their own time.”

“Leave them in peace,” echoed another Snake. A chorus of affirmation followed from others in the chamber.

Leila stood her ground. “We have no idea how many different species and cultures might be living in the bulge. *One of them* sends back the probes, but for all we know there could be a thousand others who don't yet even know that the Amalgam has tried to make contact.”

This suggestion set off a series of arguments, some between guests and hosts, some between the Snakes themselves. All the while, the Snakes kept circling excitedly, while new ones entered the chamber to witness the novel sight of these strangers.

When the clamour about the Aloof had quietened down enough for her to change the subject, Leila asked Sarah, “Why have you come to Nazdeek yourself?”



“It's out of the way, off the main routes. We can think things over here, undisturbed.”

“But you could have the same amount of privacy anywhere. It's all a matter of what you put in your précis.”

Sarah's response was imbued with a tinge of amusement. “For us, it would be unimaginably rude to cut off all contact explicitly, by decree. Especially with others from our own ancestral species. To live a quiet life, we had to reduce the likelihood of encountering anyone who would seek us out. We had to make the effort of rendering ourselves physically remote, in order to reap the benefits.”

“Yet you've made Jasim and myself very welcome.”

“Of course. But that will be enough for the next twenty years.”

So much for resurrecting their social life. “What exactly is it that you're pondering in this state of solitude?”

“The nature of reality. The uses of existence. The reasons to live, and the reasons not to.”

Leila felt the skin on her forearms tingle. She'd almost forgotten that she'd made an appointment with death, however uncertain the timing.

She explained how she and Jasim had made their decision to embark on a grand project before dying.

“That's an interesting approach,” Sarah said. “I'll have to give it some thought.” She paused, then added, “Though I'm not sure that you've solved the problem.”

“What do you mean?”

“Will it really be easier now to choose the right moment to give up your life? Haven't you merely replaced one delicate judgement with an even more difficult one: deciding when you've exhausted the possibilities for contacting the Aloof?”

“You make it sound as if we have no chance of succeeding.” Leila was not afraid of the prospect of failure, but the suggestion that it was inevitable was something else entirely.

Sarah said, “We've been here on Nazdeek for fifteen thousand years. We don't pay much attention to the world outside the nest, but even from this cloistered state we've seen many people break their backs against this rock.”

“So when will you accept that your own project is finished?” Leila countered. “If you still don't have what you're looking for after fifteen thousand years, when will you admit defeat?”

“I have no idea,” Sarah confessed. “I have no idea, any more than you do.”

## 5

When the way forward first appeared, there was nothing to set it apart from a thousand false alarms that had come before it.

It was their seventeenth year on Nazdeek. They had launched their own observatory — armed with the latest refinements culled from around the galaxy — fifteen years before, and it had been confirming the null results of its predecessors ever since.

They had settled into an unhurried routine, systematically exploring the possibilities that observation hadn't

yet ruled out. Between the scenarios that were obviously stone cold dead — the presence of an energy-rich, risk-taking, extroverted civilisation in the bulge actively seeking contact by every means at its disposal — and the infinite number of possibilities that could never be distinguished at this distance from the absence of all life, and the absence of all machinery save one dumb but efficient gatekeeper, tantalising clues would bubble up out of the data now and then, only to fade into statistical insignificance in the face of continued scrutiny.

Tens of billions of stars lying within the Aloof's territory could be discerned from Nazdeek, some of them evolving or violently interacting on a time scale of years or months. Black holes were flaying and swallowing their companions. Neutron stars and white dwarfs were stealing fresh fuel and flaring into novas. Star clusters were colliding and tearing each other apart. If you gathered data on this whole menagerie for long enough, you could expect to see almost anything. Leila would not have been surprised to wander into the garden at night and find a great welcome sign spelled out in the sky, before the fortuitous pattern of novas faded and the message dissolved into randomness again.

When their gamma ray telescope caught a glimmer of something odd — the nuclei of a certain isotope of fluorine decaying from an excited state, when there was no nearby source of the kind of radiation that could have put the nuclei into that state in the first place — it might have been just another random, unexplained fact to add to a vast pile. When the same glimmer was seen again, not far away, Leila reasoned that if a gas cloud enriched with fluorine could be affected at one location by an unseen radiation source, it should not be surprising if the same thing happened elsewhere in the same cloud.

It happened again. The three events lined up in space and time in a manner suggesting a short pulse of gamma rays in the form of a tightly focused beam, striking three different points in the gas cloud. Still, in the mountains of data they had acquired from their predecessors, coincidences far more compelling than this had occurred hundreds of thousands of times.

With the fourth flash, the balance of the numbers began to tip. The secondary gamma rays reaching Nazdeek gave only a weak and distorted impression of the original radiation, but all four flashes were consistent with a single, narrow beam. There were thousands of known gamma ray sources in the bulge, but the frequency of the radiation, the direction of the beam, and the time profile of the pulse did not fit with any of them.

The archives revealed a few dozen occasions when the same kind of emissions had been seen from fluorine nuclei under similar conditions. There had never been more than three connected events before, but one sequence had occurred along a path not far from the present one.

Leila sat by the stream and modelled the possibilities. If the beam was linking two objects in powered flight, prediction was impossible. If receiver and transmitter were mostly in free-fall, though, and only made corrections occasionally, the past and present data combined gave her a plausible forecast for the beam's future orientation.

Jasim looked into her simulation, a thought-bubble of stars and equations hovering above the water. “The whole path will lie out of bounds,” he said.

“No kidding.” The Aloof's territory was more or less spherical, which made it a convex set: you couldn't get between any two points that lay inside it without entering the territory itself. “But look how much the beam spreads out. From the fluorine data, I'd say it could be tens of kilometres wide by the time it reaches the receiver.”

“So they might not catch it all? They might let some of the beam escape into the disk?” He sounded unpersuaded.

Leila said, “Look, if they really were doing everything possible to hide this, we would never have seen these blips in the first place.”

“Gas clouds with this much fluorine are extremely rare. They obviously picked a frequency that wouldn't be scattered under ordinary circumstances.”

“Yes, but that's just a matter of getting the signal through the local environment. We choose frequencies ourselves that won't interact with any substance that's likely to be present along the route, but no choice is perfect, and we just live with that. It seems to me that they've done the same thing. If they were fanatical purists, they'd communicate by completely different methods.”

“All right.” Jasim reached into the model. “So where can we go that's in the line of sight?”

The short answer was: nowhere. If the beam was not blocked completely by its intended target it would spread out considerably as it made its way through the galactic disk, but it would not grow so wide that it would sweep across a single point where the Amalgam had any kind of outpost.

Leila said, “This is too good to miss. We need to get a decent observatory into its path.”

Jasim agreed. “And we need to do it before these nodes decide they've drifted too close to something dangerous, and switch on their engines for a course correction.”

They crunched through the possibilities. Wherever the Amalgam had an established presence, the infrastructure already on the ground could convert data into any kind of material object. Transmitting yourself to such a place, along with whatever you needed, was simplicity itself: lightspeed was the only real constraint. Excessive demands on the local resources might be denied, but modest requests were rarely rejected.

Far more difficult was building something new at a site with raw materials but no existing receiver; in that case, instead of pure data, you needed to send an engineering spore of some kind. If you were in a hurry, not only did you need to spend energy boosting the spore to relativistic velocities — a cost that snowballed due to the mass of protective shielding — you then had to waste much of the time you gained on a lengthy braking phase, or the spore would hit its target with enough energy to turn it into plasma. Interactions with the interstellar medium could be used to slow down the spore, avoiding the need to carry yet more mass to act as a propellant for braking, but the whole business was disgustingly inefficient.

Harder still was getting anything substantial to a given point in the vast empty space between the stars. With no raw materials to hand at the destination, everything had to be moved from somewhere else. The best starting point was usually to send an engineering spore into a cometary cloud, loosely bound gravitationally to its associated star, but not every such cloud was open to plunder, and everything took time, and obscene amounts of energy.

To arrange for an observatory to be delivered to the most accessible point along the beam's line of sight, travelling at the correct velocity, would take about fifteen thousand years all told. That assumed that the local cultures who owned the nearest facilities, and who had a right to veto the use of the raw materials, acceded immediately to their request.

“How long between course corrections?” Leila wondered. If the builders of this hypothetical network were efficient, the nodes could drift for a while in interstellar space without any problems, but in the bulge everything happened faster than in the disk, and the need to counter gravitational effects would come much sooner. There was no way to make a firm prediction, but they could easily have as little as eight or ten thousand years.

Leila struggled to reconcile herself to the reality. “We'll try at this location, and if we're lucky we might still catch something. If not, we'll try again after the beam shifts.” Sending the first observatory chasing after the beam would be futile; even with the present free-fall motion of the nodes, the observation point would be moving at a substantial fraction of lightspeed relative to the local stars. Magnified by the enormous distances involved, a small change in direction down in the bulge could see the beam lurch thousands of light years sideways by the time it reached the disk.

Jasim said, “Wait.” He magnified the region around the projected path of the beam.

“What are you looking for?”

He asked the map, “Are there two outposts of the Amalgam lying on a straight line that intersects the beam?”

The map replied in a tone of mild incredulity. “No.”

“That was too much to hope for. Are there three lying on a plane that intersects the beam?”

The map said, “There are about ten-to-the-eighteen triples that meet that condition.”

Leila suddenly realised what it was he had in mind. She laughed and squeezed his arm. “You are completely insane!”

Jasim said, “Let me get the numbers right first, then you can mock me.” He rephrased his question to the map. “For how many of those triples would the beam pass between them, intersecting the triangle whose vertices they lie on?”

“About ten-to-the-sixth.”

“How close to us is the closest point of intersection of the beam with any of those triangles — if the distance in each case is measured via the worst of the three outposts, the one that makes the total path longest.”

“Seven thousand four hundred and twenty-six light years.”

Leila said, “Collision braking. With three components?”

“Do you have a better idea?”

*Better than twice as fast as the fastest conventional method?* “Nothing comes to mind. Let me think about it.”

Braking against the flimsy interstellar medium was a slow process. If you wanted to deliver a payload rapidly to a point that fortuitously lay somewhere on a straight line between two existing outposts, you could fire two separate packages from the two locations and let them “collide” when they met — or rather, let them brake against each other magnetically. If you arranged for the packages to have equal and opposite momenta, they would come to a halt without any need to throw away reaction mass or clutch at passing molecules, and some of their kinetic energy could be recovered as electricity and stored for later use.

The aim and the timing had to be perfect. Relativistic packages did not make in-flight course corrections, and the data available at each launch site about the other's precise location was always a potentially imperfect prediction, not a rock-solid statement of fact. Even with the Amalgam's prodigious astrometric and computing resources, achieving millimetre alignments at thousand-light-year distances could not be

guaranteed.

Now Jasim wanted to make three of these bullets meet, perform an elaborate electromagnetic dance, and end up with just the right velocity needed to keep tracking the moving target of the beam.

In the evening, back in the house, they sat together working through simulations. It was easy to find designs that would work if everything went perfectly, but they kept hunting for the most robust variation, the one that was most tolerant of small misalignments. With standard two-body collision braking, the usual solution was to have the first package, shaped like a cylinder, pass right through a hole in the second package. As it emerged from the other side and the two moved apart again, the magnetic fields were switched from repulsive to attractive. Several “bounces” followed, and in the process as much of the kinetic energy as possible was gradually converted into superconducting currents for storage, while the rest was dissipated as electromagnetic radiation. Having three objects meeting at an angle would not only make the timing and positioning more critical, it would destroy the simple, axial symmetry and introduce a greater risk of instability.

It was dawn before they settled on the optimal design, which effectively split the problem in two. First, package one, a sphere, would meet package two, a torus, threading the gap in the middle, then bouncing back and forth through it seventeen times. The plane of the torus would lie at an angle to its direction of flight, allowing the sphere to approach it head-on. When the two finally came to rest with respect to each other, they would still have a component of their velocity carrying them straight towards package three, a cylinder with an axial borehole.

Because the electromagnetic interactions were the same as the two-body case — self-centring, intrinsically stable — a small amount of misalignment at each of these encounters would not be fatal. The usual two-body case, though, didn't require the combined package, after all the bouncing and energy dissipation was completed, to be moving on a path so precisely determined that it could pass through yet another narrow hoop.

There were no guarantees, and in the end the result would be in other people's hands. They could send requests to the three outposts, asking for these objects to be launched at the necessary times on the necessary trajectories. The energy needs hovered on the edge of politeness, though, and it was possible that one or more of the requests would simply be refused.

Jasim waved the models away, and they stretched out on the carpet, side by side.

He said, “I never thought we'd get this far. Even if this is only a mirage, I never thought we'd find one worth chasing.”

Leila said, “I don't know what I expected. Some kind of great folly: some long, exhausting, exhilarating struggle that felt like wandering through a jungle for years and ending up utterly lost.”

“And then what?”

“Surrender.”

Jasim was silent for a while. Leila could sense that he was brooding over something, but she didn't press him.

He said, “Should we travel to this observatory ourselves, or wait here for the results?”

“We should go. Definitely! I don't want to hang around here for fifteen thousand years, waiting. We can leave the Nazdeek observatories hunting for more beam fluorescence and broadcasting the results, so

we'll hear about them wherever we end up.”

“That makes sense.” Jasim hesitated, then added, “When we go, I don't want to leave a back-up.”

“Ah.” They'd travelled from Najib leaving nothing of themselves behind: if their transmission had somehow failed to make it to Nazdeek, no stored copy of the data would ever have woken to resume their truncated lives. Travel within the Amalgam's established network carried negligible risks, though. If they flung themselves towards the hypothetical location of this yet-to-be-assembled station in the middle of nowhere, it was entirely possible that they'd sail off to infinity without ever being instantiated again.

Leila said, “Are you tired of what we're doing? Of what we've become?”

“It's not that.”

“This one chance isn't the be-all and end-all. Now that we know how to hunt for the beams, I'm sure we'll find this one again after its shifts. We could find a thousand others, if we're persistent.”

“I know that,” he said. “I don't want to stop, I don't want to end this. But I want to *risk* ending it. Just once. While that still means something.”

Leila sat up and rested her head on her knees. She could understand what he was feeling, but it still disturbed her.

Jasim said, “We've already achieved something extraordinary. No one's found a clue like this in a million years. If we leave that to prosperity, it will be pursued to the end, we can be sure of that. But I desperately want to pursue it myself. With you.”

“And because you want that so badly, you need to face the chance of losing it?”

“Yes.”

It was one thing they had never tried. In their youth, they would never have knowingly risked death. They'd been too much in love, too eager for the life they'd yet to live; the stakes would have been unbearably high. In the twilight years, back on Najib, it would have been an easy thing to do, but an utterly insipid pleasure.

Jasim sat up and took her hand. “Have I hurt you with this?”

“No, no.” She shook her head pensively, trying to gather her thoughts. She didn't want to hide her feelings, but she wanted to express them precisely, not blurt them out in a confusing rush. “I always thought we'd reach the end together, though. We'd come to some point in the jungle, look around, exchange a glance, and know that we'd arrived. Without even needing to say it aloud.”

Jasim drew her to him and held her. “All right, I'm sorry. Forget everything I said.”

Leila pushed him away, annoyed. “This isn't something you can take back. If it's the truth, it's the truth. Just give me some time to decide what I want.”

They put it aside, and buried themselves in work: polishing the design for the new observatory, preparing the requests to send to the three outposts. One of the planets they would be petitioning belonged to the Snakes, so Leila and Jasim went to visit the nest for a second time, to seek advice on the best way to beg for this favour. Their neighbours seemed more excited just to see them again than they were at the news that a tiny rent had appeared in the Aloo's million-year-old cloak of discretion. When Leila gently pushed her on this point, Sarah said, “You're here, here and now, our guests in flesh and blood. I'm sure

I'll be dead long before the Aloof are willing to do the same.”

Leila thought: What kind of strange greed is it that I'm suffering from? I can be feted by creatures who rose up from the dust through a completely different molecule than my own ancestors. I can sit among them and discuss the philosophy of life and death. The Amalgam has already joined every willing participant in the galaxy into one vast conversation. And I want to go and eavesdrop on the Aloof? Just because they've played hard-to-get for a million years?

They dispatched requests for the three modules to be built and launched by their three as-yet unwitting collaborators, specifying the final countdown to the nanosecond but providing a ten-year period for the project to be debated. Leila felt optimistic; however blasé the Nazdeek nest had been, she suspected that no space-faring culture really could resist the chance to peek behind the veil.

They had thirty-six years to wait before they followed in the wake of their petitions; on top of the ten-year delay, the new observatory's modules would be travelling at a fraction of a percent below lightspeed, so they needed a head start.

No more tell-tale gamma ray flashes appeared from the bulge, but Leila hadn't expected any so soon. They had sent the news of their discovery to other worlds close to the Aloof's territory, so eventually a thousand other groups with different vantage points would be searching for the same kind of evidence and finding their own ways to interpret and exploit it. It hurt a little, scattering their hard-won revelation to the wind for anyone to use — perhaps even to beat them to some far greater prize — but they'd relied on the generosity of their predecessors from the moment they'd arrived on Nazdeek, and the sheer scale of the overall problem made it utterly perverse to cling selfishly to their own small triumph.

As the day of their departure finally arrived, Leila came to a decision. She understood Jasim's need to put everything at risk, and in a sense she shared it. If she had always imagined the two of them ending this together — struggling on, side by side, until the way forward was lost and the undergrowth closed in on them — then *that* was what she'd risk. She would take the flip side to his own wager.

When the house took their minds apart and sent them off to chase the beam, Leila left a copy of herself frozen on Nazdeek. If no word of their safe arrival reached it by the expected time, it would wake and carry on the search.

Alone.

## 6

“Welcome to Trident. We're honoured by the presence of our most distinguished guest.”

Jasim stood beside the bed, waving a triangular flag. Red, green and blue in the corners merged to white in the centre.

“How long have you been up?”

“About an hour,” he said. Leila frowned, and he added apologetically, “You were sleeping very deeply, I didn't want to disturb you.”

“I should be the one giving the welcome,” she said. “You're the one who might never have woken.”

The bedroom window looked out into a dazzling field of stars. It was not a view facing the bulge — by now Leila could recognise the distinctive spectra of the region's stars with ease — but even these disk stars were so crisp and bright that this was like no sky she had ever seen.

“Have you been downstairs?” she said.

“Not yet. I wanted us to decide on that together.” The house had no physical wing here; the tiny observatory had no spare mass for such frivolities as embodying them, let alone constructing architectural follies in the middle of interstellar space. “Downstairs” would be nothing but a scape that they were free to design at will.

“Everything worked,” she said, not quite believing it.

Jasim spread his arms. “We're here, aren't we?”

They watched a reconstruction of the first two modules coming together. The timing and the trajectories were as near to perfect as they could have hoped for, and the superconducting magnets had been constructed to a standard of purity and homogeneity that made the magnetic embrace look like an idealised simulation. By the time the two had locked together, the third module was just minutes away. Some untraceable discrepancy between reality and prediction in the transfer of momentum to radiation had the composite moving at a tiny angle away from its expected course, but when it met the third module the magnetic fields still meshed in a stable configuration, and there was energy to spare to nudge the final assembly precisely into step with the predicted swinging of the Aloof's beam.

The Amalgam had lived up to its promise: three worlds full of beings they had never met, who owed them nothing, who did not even share their molecular ancestry, had each diverted enough energy to light up all their cities for a decade, and followed the instructions of strangers down to the atom, down to the nanosecond, in order to make this work.

What happened now was entirely in the hands of the Aloof.

Trident had been functioning for about a month before its designers had arrived to take up occupancy. So far, it had not yet observed any gamma ray signals spilling out of the bulge. The particular pulse that Leila and Jasim had seen triggering fluorescence would be long gone, of course, but the usefulness of their present location was predicated on three assumptions: the Aloof would use the same route for many other bursts of data; some of the radiation carrying that data would slip past the intended receiver; and the two nodes of the network would have continued in free fall long enough for the spilt data to be arriving here still, along the same predictable path.

Without those three extra components, delivered by their least reliable partners, Trident would be worthless.

“Downstairs,” Leila said. “Maybe a kind of porch with glass walls?”

“Sounds fine to me.”

She conjured up a plan of the house and sketched some ideas, then they went down to try them out at full scale.

They had been into orbit around Najib, and they had travelled embodied to its three beautiful, barren sibling worlds, but they had never been in interstellar space before. Or at least, they had never been conscious of it.

They were still not truly embodied, but you didn't need flesh and blood to feel the vacuum around you; to be awake and plugged-in to an honest depiction of your surroundings was enough. The nearest of Trident's contributor worlds was six hundred light years away. The distance to Najib was unthinkable. Leila paced around the porch, looking out at the stars, vertiginous in her virtual body, unsteady in the



phoney gravity.

It had been twenty-eight thousand years since they'd left Najib. All her children and grandchildren had almost certainly chosen death, long ago. No messages had been sent after them to Nazdeek; Leila had asked for that silence, fearing that it would be unbearably painful to hear news, day after day, to which she could give no meaningful reply, about events in which she could never participate. Now she regretted that. She wanted to read the lives of her grandchildren, as she might the biography of an ancestor. She wanted to know how things had ended up, like the time traveller she was.

A second month of observation passed, with nothing. A data feed reaching them from Nazdeek was equally silent. For any new hint of the beam's location to reach Nazdeek, and then the report of that to reach Trident, would take thousands of years longer than the direct passage of the beam itself, so if Nazdeek saw evidence that the beam was "still" on course, that would be old news about a pulse they had not been here to intercept. However, if Nazdeek reported that the beam had shifted, at least that would put them out of their misery immediately, and tell them that Trident had been built too late.

Jasim made a vegetable garden on the porch and grew exotic food in the starlight. Leila played along, and ate beside him; it was a harmless game. They could have painted anything at all around the house: any planet they'd visited, drawn from their memories, any imaginary world. If this small pretence was enough to keep them sane and anchored to reality, so be it.

Now and then, Leila felt the strangest of the many pangs of isolation Trident induced: here, the knowledge of the galaxy was no longer at her fingertips. Their descriptions as travellers had encoded their vast personal memories, declarative and episodic, and their luggage had included prodigious libraries, but she was used to having so much more. Every civilised planet held a storehouse of information that was simply too bulky to fit into Trident, along with a constant feed of exabytes of news flooding in from other worlds. Wherever you were in the galaxy, some news was old news, some cherished theories long discredited, some facts hopelessly out of date. Here, though, Leila knew, there were billions of rigorously established truths — the results of hundreds of millennia of thought, experiment, and observation — that had slipped out of her reach. Questions that any other child of the Amalgam could expect to have answered instantly would take twelve hundred years to receive a reply.

No such questions actually came into her mind, but there were still moments when the mere fact of it was enough to make her feel unbearably rootless, cut adrift not only from her past and her people, but from civilisation itself.

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Trident shouted: "Data!"

Leila was half-way through recording a postcard to the Nazdeek Snakes. Jasim was on the porch watering his plants. Leila turned to see him walking through the wall, commanding the bricks to part like a gauze curtain.

They stood side by side, watching the analysis emerge.

A pulse of gamma rays of the expected frequency, from precisely the right location, had just washed over Trident. The beam was greatly attenuated by distance, not to mention having had most of its energy intercepted by its rightful owner, but more than enough had slipped past and reached them for Trident to make sense of the nature of the pulse.

It was, unmistakably, modulated with information. There were precisely repeated phase shifts in the radiation that were unimaginable in any natural gamma ray source, and which would have been pointless in any artificial beam produced for any purpose besides communication.

The pulse had been three seconds long, carrying about ten-to-the-twenty-fourth bits of data. The bulk of this appeared to be random, but that did not rule out meaningful content, it simply implied efficient encryption. The Amalgam's network sent encrypted data via robust classical channels like this, while sending the keys needed to decode it by a second, quantum channel. Leila had never expected to get hold of unencrypted data, laying bare the secrets of the Aloof in an instant. To have clear evidence that someone in the bulge was talking to someone else, and to have pinned down part of the pathway connecting them, was vindication enough.

There was more, though. Between the messages themselves, Trident had identified brief, orderly, unencrypted sequences. Everything was guesswork to a degree, but with such a huge slab of data statistical measures were powerful indicators. Part of the data looked like routing information, addresses for the messages as they were carried through the network. Another part looked like information about the nodes' current and future trajectories. If Trident really had cracked that, they could work out where to position its successor. In fact, if they placed the successor close enough to the bulge, they could probably keep that one observatory constantly inside the spill from the beam.

Jasim couldn't resist playing devil's advocate. "You know, this could just be one part of whatever throws the probes back in our faces, talking to another part. The Aloof themselves could still be dead, while their security system keeps humming with paranoid gossip."

Leila said blithely, "Hypothesise away. I'm not taking the bait."

She turned to embrace him, and they kissed. She said, "I've forgotten how to celebrate. What happens now?"

He moved his fingertips gently along her arm. Leila opened up the scape, creating a fourth spatial dimension. She took his hand, kissed it, and placed it against her beating heart. Their bodies reconfigured, nerve-endings crowding every surface, inside and out.

Jasim climbed inside her, and she inside him, the topology of the scape changing to wrap them together in a mutual embrace. Everything vanished from their lives but pleasure, triumph, and each other's presence, as close as it could ever be.

## 7

"Are you here for the Listening Party?"

The chitinous heptapod, who'd been wandering the crowded street with a food cart dispensing largesse at random, offered Leila a plate of snacks tailored to her and Jasim's preferences. She accepted it, then paused to let Tassef, the planet they'd just set foot on, brief her as to the meaning of this phrase. People, Tassef explained, had travelled to this world from throughout the region in order to witness a special event. Some fifteen thousand years before, a burst of data from the Aloof's network had been picked up by a nearby observatory. In isolation, these bursts meant very little; however, the locals were hopeful that at least one of several proposed observatories near Massa, on the opposite side of the bulge, would have seen spillage including many of the same data packets, forty thousand years before. If any such observations had in fact taken place, news of their precise contents should now, finally, be about to reach Tassef by the longer, disk-based routes of the Amalgam's own network. Once the two observations could be compared, it would become clear which messages from the earlier Eavesdropping session had made their way to the part of the Aloof's network that could be sampled from Tassef. The comparison would advance the project of mapping all the symbolic addresses seen in the data onto actual physical locations.

Leila said, "That's not why we came, but now we know, we're even more pleased to be here."

The heptapod emitted a chirp that Leila understood as a gracious welcome, then pushed its way back into the throng.

Jasim said, "Remember when you told me that everyone would get bored with the Aloof while we were still in transit?"

"I said that would happen eventually. If not this trip, the next one."

"Yes, but you said it five journeys ago."

Leila scowled, preparing to correct him, but then she checked and he was right.

They hadn't expected Tassef to be so crowded when they'd chosen it as their destination, some ten thousand years before. The planet had given them a small room in this city, Shalouf, and imposed a thousand-year limit on their presence if they wished to remain embodied without adopting local citizenship. More than a billion visitors had arrived over the last fifty years, anticipating the news of the observations from Massa, but unable to predict the precise time it would reach Tassef because the details of the observatories' trajectories had still been in transit.

She confessed, "I never thought a billion people would arrange their travel plans around this jigsaw puzzle."

"Travel plans?" Jasim laughed. "We chose to have our own deaths revolve around the very same thing."

"Yes, but we're just weird."

Jasim gestured at the crowded street. "I don't think we can compete on that score."

They wandered through the city, drinking in the decades-long-carnival atmosphere. There were people of every phenotype Leila had encountered before, and more: bipeds, quadrupeds, hexapods, heptapods, walking, shuffling, crawling, scuttling, or soaring high above the street on feathered, scaled or membranous wings. Some were encased in their preferred atmospheres; others, like Leila and Jasim, had chosen instead to be embodied in ersatz flesh that didn't follow every ancestral chemical dictate. Physics and geometry tied evolution's hands, and many attempts to solve the same problems had converged on similar answers, but the galaxy's different replicators still managed their idiosyncratic twists. When Leila let her translator sample the cacophony of voices and signals at random, she felt as if the whole disk, the whole Amalgam, had converged on this tiny metropolis.

In fact, most of the travellers had come just a few hundred light years to be here. She and Jasim had chosen to keep their role in the history of Eavesdropping out of their précis, and Leila caught herself with a rather smug sense of walking among the crowd like some unacknowledged sage, bemused by the late-blooming, and no doubt superficial, interest of the masses. On reflection, though, any sense of superior knowledge was hard to justify, when most of these people would have grown up steeped in developments that she was only belatedly catching up with. A new generation of observatories had been designed while she and Jasim were in transit, based on "strong bullets": specially designed femtomachines, clusters of protons and neutrons stable only for trillionths of a second, launched at ultra-relativistic speeds so great that time dilation enabled them to survive long enough to collide with other components and merge into tiny, short-lived gamma-ray observatories. The basic trick that had built Trident had gone from a one-off gamble into a miniaturised, mass-produced phenomenon, with literally billions of strong bullets being fired continuously from thousands of planets around the inner disk.

Femtomachines themselves were old hat, but it had taken the technical challenges of Eavesdropping to motivate someone into squeezing a few more tricks out of them. Historians had always understood that in the long run, technological progress was a horizontal asymptote: once people had more or less everything they wanted that was physically possible, every incremental change would take exponentially longer to achieve, with diminishing returns and ever less reason to bother. The Amalgam would probably spend an eon inching its way closer to the flatline, but this was proof that shifts of circumstance alone could still trigger a modest renaissance or two, without the need for any radical scientific discovery or even a genuinely new technology.

They stopped to rest in a square, beside a small fountain gushing aromatic hydrocarbons. The Tassef locals, quadrupeds with slick, rubbery hides, played in the sticky black spray then licked each other clean.

Jasim shaded his eyes from the sun. He said, “We’ve had our autumn child, and we’ve seen its grandchildren prosper. I’m not sure what’s left.”

“No.” Leila was in no rush to die, but they’d sampled fifty thousand years of their discovery’s consequences. They’d followed in the wake of the news of the gamma ray signals as it circled the inner disk, spending less than a century conscious as they sped from world to world. At first they’d been hunting for some vital new role to play, but they’d slowly come to accept that the avalanche they’d triggered had out-raced them. Physical and logical maps of the Aloof’s network were being constructed, as fast as the laws of physics allowed. Billions of people on thousands of planets, scattered around the inner rim of the Amalgam’s territory, were sharing their observations to help piece together the living skeleton of their elusive neighbours. When that project was complete it would not be the end of anything, but it could mark the start of a long hiatus. The encrypted, classical data would never yield anything more than traffic routes; no amount of ingenuity could extract its content. The quantum keys that could unlock it, assuming the Aloof even used such things, would be absolutely immune to theft, duplication, or surreptitious sampling. One day, there would be another breakthrough, and everything would change again, but did they want to wait a hundreds thousand years, a million, just to see what came next?

The solicitous heptapods — not locals, but visitors from a world thirty light years away who had nonetheless taken on some kind of innate duty of hospitality — seemed to show up whenever anyone was hungry. Leila tried to draw this second one into conversation, but it politely excused itself to rush off and feed someone else.

Leila said, “Maybe this is it. We’ll wait for the news from Massa, then celebrate for a while, then finish it.”

Jasim took her hand. “That feels right to me. I’m not certain, but I don’t think I’ll ever be.”

“Are you tired?” she said. “Bored?”

“Not at all,” he replied. “I feel *satisfied*. With what we’ve done, what we’ve seen. And I don’t want to dilute that. I don’t want to hang around forever, watching it fade, until we start to feel the way we did on Najib all over again.”

“No.”

They sat in the square until dusk, and watched the stars of the bulge come out. They’d seen this dazzling jewelled hub from every possible angle now, but Leila never grew tired of the sight.

Jasim gave an amused, exasperated sigh. “That beautiful, maddening, unreachable place. I think the whole Amalgam will be dead and gone without anyone setting foot inside it.”

Leila felt a sudden surge of irritation, which deepened into a sense of revulsion. “It's a place, like any other place! Stars, gas, dust, planets. It's not some metaphysical realm. It's not even far away. Our own home world is twenty times more distant.”

“Our own home world doesn't have an impregnable fence around it. If we really wanted to, we could go back there.”

Leila was defiant. “If we really wanted to, we could enter the bulge.”

Jasim laughed. “Have you read something in those messages that you didn't tell me about? How to say ‘open sesame’ to the gatekeepers?”

Leila stood, and summoned a map of the Aloof's network to superimpose across their vision, criss-crossing the sky with slender cones of violet light. One cone appeared head-on, as a tiny circle: the beam whose spillage came close to Tassef. She put her hand on Jasim's shoulder, and zoomed in on that circle. It opened up before them like a beckoning tunnel.

She said, “We know where this beam is coming from. We don't know for certain that the traffic between these particular nodes runs in both directions, but we've found plenty of examples where it does. If we aim a signal from here, back along the path of the spillage, and we make it wide enough, then we won't just hit the sending node. We'll hit the receiver as well.”

Jasim was silent.

“We know the data format,” she continued. “We know the routing information. We can address the data packets to a node on the other side of the bulge, one where the spillage comes out at Massa.”

Jasim said, “What makes you think they'll accept the packets?”

“There's nothing in the format we don't understand, nothing we can't write for ourselves.”

“Nothing in the unencrypted part. If there's an authorisation, even a checksum, in the encrypted part, then any packet without that will be tossed away as noise.”

“That's true,” she conceded.

“Do you really want to do this?” he said. Her hand was still on his shoulder, she could feel his body growing tense.

“Absolutely.”

“We mail ourselves from here to Massa, as unencrypted, classical data that anyone can read, anyone can copy, anyone can alter or corrupt?”

“A moment ago you said they'd throw us away as noise.”

“That's the least of our worries.”

“Maybe.”

Jasim shuddered, his body almost convulsing. He let out a string of obscenities, then made a choking sound. “What's wrong with you? Is this some kind of test? If I call your bluff, will you admit that you're joking?”

Leila shook her head. “And no, it's not revenge for what you did on the way to Trident. This is our

chance. *This* is what we were waiting to do — not the Eavesdropping, that's nothing! The bulge is right here in front of us. The Aloof are in there, somewhere. We can't force them to engage with us, but we can get closer to them than anyone has ever been before.”

“If we go in this way, they could do anything to us.”

“They're not barbarians. They haven't made war on us. Even the engineering spores come back unharmed.”

“If we infest their network, that's worse than an engineering spore.”

“‘Infest’! None of these routes are crowded. A few exabytes passing through is nothing.”

“You have no idea how they'll react.”

“No,” she confessed. “I don't. But I'm ready to find out.”

Jasim stood. “We could send a test message first. Then go to Massa and see if it arrived safely.”

“We could do that,” Leila conceded. “That would be a sensible plan.”

“So you agree?” Jasim gave her a wary, frozen smile. “We'll send a test message. Send an encyclopedia. Send greetings in some universal language.”

“Fine. We'll send all of those things first. But I'm not waiting more than one day after that. I'm not going to Massa the long way. I'm taking the short-cut, I'm going through the bulge.”

## 8

The Amalgam had been so generous to Leila, and local interest in the Aloof so intense, that she had almost forgotten that she was not, in fact, entitled to a limitless and unconditional flow of resources, to be employed to any end that involved her obsession.

When she asked Tassef for the means to build a high-powered gamma-ray transmitter to aim into the bulge, it interrogated her for an hour, then replied that the matter would require a prolonged and extensive consultation. It was, she realised, no use protesting that compared to hosting a billion guests for a couple of centuries, the cost of this was nothing. The sticking point was not the energy use, or any other equally microscopic consequence for the comfort and amenity of the Tassef locals. The issue was whether her proposed actions might be seen as unwelcome and offensive by the Aloof, and whether that affront might in turn provoke some kind of retribution.

Countless probes and spores had been gently and patiently returned from the bulge unharmed, but they'd come blundering in at less than lightspeed. A flash of gamma rays could not be intercepted and returned before it struck its chosen target. Though it seemed to Leila that it would be a trivial matter for the network to choose to reject the data, it was not unreasonable to suppose that the Aloof's sensibilities might differ on this point from her own.

Jasim had left Shalouf for a city on the other side of the planet. Leila's feelings about this were mixed; it was always painful when they separated, but the reminder that they were not irrevocably welded together also brought an undeniable sense of space and freedom. She loved him beyond measure, but that was not the final word on every question. She was not certain that she would not relent in the end, and die quietly beside him when the news came through from Massa; there were moments when it seemed utterly perverse, masochistic and self-aggrandising to flee from that calm, dignified end for the sake of trying to cap their modest revolution with a new and spectacularly dangerous folly. Nor though, was she certain

that Jasim would not change his own mind, and take her hand while they plunged off this cliff together.

When the months dragged on with no decision on her request, no news from Massa and no overtures from her husband, Leila became an orator, travelling from city to city promoting her scheme to blaze a trail through the heart of the bulge. Her words and image were conveyed into virtual fora, but her physical presence was a way to draw attention to her cause, and Listening Party pilgrims and Tassefi alike packed the meeting places when she came. She mastered the locals' language and style, but left it inflected with some suitably alien mannerisms. The fact that a rumour had arisen that she was one of the First Eavesdroppers did no harm to her attendance figures.

When she reached the city of Jasim's self-imposed exile, she searched the audience for him in vain. As she walked out into the night a sense of panic gripped her. She felt no fear for herself, but the thought of him dying here alone was unbearable.

She sat in the street, weeping. How had it come to this? They had been prepared for a glorious failure, prepared to be broken by the Aloof's unyielding silence, and instead the fruits of their labour had swept through the disk, reinvigorating a thousand cultures. How could the taste of success be so bitter?

Leila imagined calling out to Jasim, finding him, holding him again, repairing their wounds.

A splinter of steel remained inside her, though. She looked up into the blazing sky. The Aloof were there, waiting, daring her to stand before them. To come this far, then step back from the edge for the comfort of a familiar embrace, would diminish her. She would not retreat.

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The news arrived from Massa: forty thousand years before, the spillage from the far side of the bulge had been caught in time. Vast swathes of the data matched the observations that Tassef had been holding in anticipation of this moment, for the last fifteen thousand years.

There was more: reports of other correlations from other observatories followed within minutes. As the message from Massa had been relayed around the inner disk, a cascade of similar matches with other stores of data had been found.

By seeing where packets dropped out of the stream, their abstract addresses became concrete, physical locations within the bulge. As Leila stood in Shalouf's main square in the dusk, absorbing the reports, the Aloof's network was growing more solid, less ethereal, by the minute.

The streets around her were erupting with signs of elation: polyglot shouts, chirps and buzzes, celebratory scents and vivid pigmentation changes. Bursts of luminescence spread across the square. Even the relentlessly sober heptapods had abandoned their food carts to lie on their backs, spinning with delight. Leila wheeled around, drinking it in, commanding her translator to punch the meaning of every disparate gesture and sound deep into her brain, unifying the kaleidoscope into a single emotional charge.

As the stars of the bulge came out, Tassef offered an overlay for everyone to share, with the newly mapped routes shining like golden highways. From all around her, Leila picked up the signals of those who were joining the view: people of every civilisation, every species, every replicator were seeing the Aloof's secret roads painted across the sky.

Leila walked through the streets of Shalouf, feeling Jasim's absence sharply, but too familiar with that pain to be overcome by it. If the joy of this moment was muted, every celebration would be blighted in the same way, now. She could not expect anything else. She would grow inured to it.

Tassef spoke to her.

“The citizens have reached a decision. They will grant your request.”

“I’m grateful.”

“There is a condition. The transmitter must be built at least twenty light-years away, either in interstellar space, or in the circumstellar region of an uninhabited system.”

“I understand.” This way, in the event that the Aloof felt threatened to the point of provoking destructive retribution, Tassef would survive an act of violence, at least on a stellar scale, directed against the transmitter itself.

“We advise you to prepare your final plans for the hardware, and submit them when you’re sure they will fulfil your purpose.”

“Of course.”

Leila went back to her room, and reviewed the plans she had already drafted. She had anticipated the Tassefi wanting a considerable safety margin, so she had worked out the energy budgets for detailed scenarios involving engineering spores and forty-seven different cometary clouds that fell within Tassef’s jurisdiction. It took just seconds to identify the best one that met the required conditions, and she lodged it without hesitation.

Out on the streets, the Listening Party continued. For the billion pilgrims, this was enough: they would go home, return to their grandchildren, and die happy in the knowledge that they had finally seen something new in the world. Leila envied them; there’d been a time when that would have been enough for her, too.

She left her room and rejoined the celebration, talking, laughing, dancing with strangers, letting herself grow giddy with the moment. When the sun came up, she made her way home, stepping lightly over the sleeping bodies that filled the street.

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The engineering spores were the latest generation: strong bullets launched at close to lightspeed that shed their momentum by diving through the heart of a star, and then rebuilding themselves at atomic density as they decayed in the stellar atmosphere. In effect, the dying femtomachines constructed nanomachines bearing the same blueprints as they’d carried within themselves at nuclear densities, and which then continued out to the cometary cloud to replicate and commence the real work of mining raw materials and building the gamma ray transmitter.

Leila contemplated following in their wake, sending herself as a signal to be picked up by the as-yet-unbuilt transmitter. It would not have been as big a gamble as Jasim’s with Trident; the strong bullets had already been used successfully this way in hundreds of similar stars.

In the end, she chose to wait on Tassef for a signal that the transmitter had been successfully constructed, and had tested, aligned and calibrated itself. If she was going to march blindly into the bulge, it would be absurd to stumble and fall prematurely, before she even reached the precipice.

When the day came, some ten thousand people gathered in the centre of Shalouf to bid the traveller a safe journey. Leila would have preferred to slip away quietly, but after all her lobbying she had surrendered her privacy, and the Tassefi seemed to feel that she owed them this last splash of colour and ceremony.

Forty-six years after the Listening Party, most of the pilgrims had returned to their homes, but of the few hundred who had lingered in Shalouf nearly all had showed up for this curious footnote to the main event. Leila wasn’t sure that anyone here believed the Aloof’s network would do more than bounce her straight



back into the disk, but the affection these well-wishers expressed seemed genuine. Someone had even gone to the trouble of digging up a phrase in the oldest known surviving language of her ancestral species: *safar bekheyr*, may your journey be blessed. They had written it across the sky in an ancient script that she'd last seen eighty thousand years before, and it had been spread among the crowd phonetically so that everyone she met could offer her this hopeful farewell as she passed.

Tassef, the insentient delegate of all the planet's citizens, addressed the crowd with some sombre ceremonial blather. Leila's mind wandered, settling on the observation that she was probably partaking in a public execution. No matter. She had said goodbye to her friends and family long ago. When she stepped through the ceremonial gate, which had been smeared with a tarry mess that the Tassefi considered the height of beauty, she would close her eyes and recall her last night on Najib, letting the intervening millennia collapse into a dream. Everyone chose death in the end, and no one's exit was perfect. Better to rely on your own flawed judgements, better to make your own ungainly mess of it, than live in the days when nature would simply take you at random.

As Tassef fell silent, a familiar voice rose up from the crowd.

“Are you still resolved to do this foolish thing?”

Leila glared down at her husband. “Yes, I am.”

“You won't reconsider?”

“No.”

“Then I'm coming with you.”

Jasim pushed his way through the startled audience, and climbed onto the stage.

Leila spoke to him privately. “You're embarrassing us both.”

He replied the same way. “Don't be petty. I know I've hurt you, but the blame lies with both of us.”

“Why are you doing this? You've made your own wishes very plain.”

“Do you think I can watch you walk into danger, and not walk beside you?”

“You were ready to die if Trident failed. You were ready to leave me behind then.”

“Once I spoke my mind on that you gave me no choice. You insisted.” He took her hand. “You know I only stayed away from you all this time because I hoped it would dissuade you. I failed. So now I'm here.”

Leila's heart softened. “You're serious? You'll come with me?”

Jasim said, “Whatever they do to you, let them do it to us both.”

Leila had no argument to make against this, no residue of anger, no false solicitousness. She had always wanted him beside her at the end, and she would not refuse him now.

She spoke to Tassef. “One more passenger. Is that acceptable?” The energy budget allowed for a thousand years of test transmissions to follow in her wake; Jasim would just be a minor blip of extra data.

“It's acceptable.” Tassef proceeded to explain the change to the assembled crowd, and to the onlookers scattered across the planet.

Jasim said, “We'll interweave the data from both of us into a single packet. I don't want to end up at Massa and find they've sent you to Jahnóm by mistake.”

“All right.” Leila arranged the necessary changes. None of the Eavesdroppers yet knew that they were coming, and no message sent the long way could warn them in time, but the data they sent into the bulge would be prefaced by instructions that anyone in the Amalgam would find clear and unambiguous, asking that their descriptions only be embodied if they were picked up at Massa. If they were found in other spillage along the way, they didn't want to be embodied multiple times. And if they did not emerge at Massa at all, so be it.

Tassef's second speech came to an end. Leila looked down at the crowd one last time, and let her irritation with the whole bombastic ceremony dissipate into amusement. If she had been among the sane, she might easily have turned up herself to watch a couple of ancient fools try to step onto the imaginary road in the sky, and wish them *safar bekheyr*.

She squeezed Jasim's hand, and they walked towards the gate.

## 9

Leila's fingers came together, her hand empty. She felt as if she was falling, but nothing in sight appeared to be moving. Then again, all she could see was a distant backdrop, its scale and proximity impossible to judge: thousands of fierce blue stars against the blackness of space.

She looked around for Jasim, but she was utterly alone. She could see no vehicle or other machine that might have disgorged her into this emptiness. There was not even a planet below her, or a single brightest star to which she might be bound. Absurdly, she was breathing. Every other cue told her that she was drifting through vacuum, probably through interstellar space. Her lungs kept filling and emptying, though. The air, and her skin, felt neither hot nor cold.

Someone or something had embodied her, or was running her as software. She was not on Massa, she was sure of that; she had never visited that world, but nowhere in the Amalgam would a guest be treated like this. Not even one who arrived unannounced in data spilling out from the bulge.

Leila said, “Are you listening to me? Do you understand me?” She could hear her own voice, flat and without resonance. The acoustics made perfect sense in a vast, empty, windless place, if not an airless one.

Anywhere in the Amalgam, you *knew* whether you were embodied or not; it was the nature of all bodies, real or virtual, that declarative knowledge of every detail was there for the asking. Here, when Leila tried to summon the same information, her mind remained blank. It was like the strange absence she'd felt on Trident, when she'd been cut off from the repositories of civilisation, but here the amputation had reached all the way inside her.

She inhaled deeply, but there was no noticeable scent at all, not even the whiff of her own body odour that she would have expected, whether she was wearing her ancestral phenotype or any of the forms of ersatz flesh that she adopted when the environment demanded it. She pinched the skin of her forearm; it felt more like her original skin than any of the substitutes she'd ever worn. They might have fashioned this body out of something both remarkably lifelike and chemically inert, and placed her in a vast, transparent container of air, but she was beginning to pick up a strong stench of ersatz physics. Air and skin alike, she suspected, were made of bits, not atoms.

*So where was Jasim?* Were they running him too, in a separate scape? She called out his name, trying not to make the exploratory cry sound plaintive. She understood all too well now why he'd tried so hard

to keep her from this place, and why he'd been unable to face staying behind: the thought that the Aloof might be doing something unspeakable to his defenceless consciousness, in some place she couldn't hope to reach or see, was like a white hot blade pressed to her heart. All she could do was try to shut off the panic and talk down the possibility. *All right, he's alone here, but so am I, and it's not that bad.* She would put her faith in symmetry; if they had not abused her, why would they have harmed Jasim?

She forced herself to be calm. The Aloof had taken the trouble to grant her consciousness, but she couldn't expect the level of amenity she was accustomed to. For a start, it would be perfectly reasonable if her hosts were unable or unwilling to plug her into any data source equivalent to the Amalgam's libraries, and perhaps the absence of somatic knowledge was not much different. Rather than deliberately fooling her about her body, maybe they had looked at the relevant data channels and decided that *anything* they fed into them would be misleading. Understanding her transmitted description well enough to bring her to consciousness was one thing, but it didn't guarantee that they knew how to translate the technical details of their instantiation of her into her own language.

And if this ignorance-plus-honesty excuse was too sanguine to swallow, it wasn't hard to think of the Aloof as being pathologically secretive without actually being malicious. If they wanted to keep quiet about the way they'd brought her to life lest it reveal something about themselves, that too was understandable. They need not be doing it for the sake of tormenting her.

Leila surveyed the sky around her, and felt a jolt of recognition. She'd memorised the positions of the nearest stars to the target node where her transmission would first be sent, and now a matching pattern stood out against the background in a collection of distinctive constellations. She was being shown the sky from that node. This didn't prove anything about her actual location, but the simplest explanation was that the Aloof had instantiated her here, rather than sending her on through the network. The stars were in the positions she'd predicted for her time of arrival, so if this was the reality, there had been little delay in choosing how to deal with the intruder. No thousand-year-long deliberations, no passing of the news to a distant decision-maker. Either the Aloof themselves were present here, or the machinery of the node was so sophisticated that they might as well have been. She could not have been woken by accident; it had to have been a deliberate act. It made her wonder if the Aloof had been expecting something like this for millennia.

“What now?” she asked. Her hosts remained silent. “Toss me back to Tassef?” The probes with their reversed trajectories bore no record of their experience; perhaps the Aloof wouldn't incorporate these new memories into her description before returning her. She spread her arms imploringly. “If you're going to erase this memory, why not speak to me first? I'm in your hands completely, you can send me to the grave with your secrets. Why wake me at all, if you don't want to talk?”

In the silence that followed, Leila had no trouble imagining one answer: to study her. It was a mathematical certainty that some questions about her behaviour could never be answered simply by examining her static description; the only reliable way to predict what she'd do in any given scenario was to wake her and confront her with it. They might, of course, have chosen to wake her any number of times before, without granting her memories of the previous instantiations. She experienced a moment of sheer existential vertigo: this could be the thousandth, the billionth, in a vast series of experiments, as her captors permuted dozens of variables to catalogue her responses.

The vertigo passed. Anything was possible, but she preferred to entertain more pleasant hypotheses.

“I came here to talk,” she said. “I understand that you don't want us sending in machinery, but there must be something we can discuss, something we can learn from each other. In the disk, every time two space-faring civilisations met, they found they had something in common. Some mutual interests, some mutual benefits.”

At the sound of her own earnest speech dissipating into the virtual air around her, Leila started laughing. The arguments she'd been putting for centuries to Jasim, to her friends on Najib, to the Snakes on Nazdeek, seemed ridiculous now, embarrassing. How could she face the Aloof and claim that she had anything to offer them that they had not considered, and rejected, hundreds of thousands of years before? The Amalgam had never tried to keep its nature hidden. The Aloof would have watched them, studied them from afar, and consciously chosen isolation. To come here and list the advantages of contact as if they'd never crossed her hosts' minds was simply insulting.

Leila fell silent. If she had lost faith in her role as cultural envoy, at least she'd proved to her own satisfaction that there was something in here smarter than the sling-shot fence the probes had encountered. The Aloof had not embraced her, but the whole endeavour had not been in vain. To wake in the bulge, even to silence, was far more than she'd ever had the right to hope for.

She said, "Please, just bring me my husband now, then we'll leave you in peace."

This entreaty was met in the same way as all the others. Leila resisted speculating again about experimental variables. She did not believe that a million-year-old civilisation was interested in testing her tolerance to isolation, robbing her of her companion and seeing how long she took to attempt suicide. The Aloof did not take orders from her; fine. If she was neither an experimental subject to be robbed of her sanity, nor a valued guest whose every wish was granted, there had to be some other relationship between them that she had yet to fathom. She had to be conscious for a reason.

She searched the sky for a hint of the node itself, or any other feature she might have missed, but she might as well have been living inside a star map, albeit one shorn of the usual annotations. The Milky Way, the plane of stars that bisected the sky, was hidden by the thicker clouds of gas and dust here, but Leila had her bearings; she knew which way led deeper into the bulge, and which way led back out to the disk.

She contemplated Tassef's distant sun with mixed emotions, as a sailor might look back on the last sight of land. As the yearning for that familiar place welled up, a cylinder of violet light appeared around her, encircling the direction of her gaze. For the first time, Leila felt her weightlessness interrupted: a gentle acceleration was carrying her forward along the imaginary beam.

"No! Wait!" She closed her eyes and curled into a ball. The acceleration halted, and when she opened her eyes the tunnel of light was gone.

She let herself float limply, paying no attention to anything in the sky, waiting to see what happened if she kept her mind free of any desire for travel.

After an hour like this, the phenomenon had not recurred. Leila turned her gaze in the opposite direction, into the bulge. She cleared her mind of all timidity and nostalgia, and imagined the thrill of rushing deeper into this violent, spectacular, alien territory. At first there was no response from the scape, but then she focused her attention sharply in the direction of a second node, the one she'd hoped her transmission would be forwarded to from the first, on its way through the galactic core.

The same violet light, the same motion. This time, Leila waited a few heartbeats longer before she broke the spell.

Unless this was some pointlessly sadistic game, the Aloof were offering her a clear choice. She could return to Tassef, return to the Amalgam. She could announce that she'd put a toe in these mysterious waters, and lived to tell the tale. Or she could dive into the bulge, as deep as she'd ever imagined, and see where the network took her.

“No promises?” she asked. “No guarantee I’ll come out the other side? No intimations of contact, to tempt me further?” She was thinking aloud, she did not expect answers. Her hosts, she was beginning to conclude, viewed strangers through the prism of a strong, but very sharply delineated, sense of obligation. They sent back the insentient probes to their owners, scrupulously intact. They had woken this intruder to give her the choice: did she really want to go where her transmission suggested, or had she wandered in here like a lost child who just needed to find the way home? They would do her no harm, and send her on no journey without her consent, but those were the limits of their duty of care. They did not owe her any account of themselves. She would get no greeting, no hospitality, no conversation.

“What about Jasim? Will you give me a chance to consult with him?” She waited, picturing his face, willing his presence, hoping they might read her mind if her words were beyond them. If they could decode a yearning towards a point in the sky, surely this wish for companionship was not too difficult to comprehend? She tried variations, dwelling on the abstract structure of their intertwined data in the transmission, hoping this might clarify the object of her desire if his physical appearance meant nothing to them.

She remained alone.

The stars that surrounded her spelt out the only choices on offer. If she wanted to be with Jasim once more before she died, she had to make the same decision as he did.

Symmetry demanded that he faced the same dilemma.

*How would he be thinking?* He might be tempted to retreat back to the safety of Tassef, but he'd reconciled with her in Shalouf for the sole purpose of following her into danger. He would understand that she'd want to go deeper, would want to push all the way through to Massa, opening up the short-cut through the core, proving it safe for future travellers.

Would he understand, too, that she'd feel a pang of guilt at this presumptuous line of thought, and that she'd contemplate making a sacrifice of her own? He had braved the unknown for her, and they had reaped the reward already: they had come closer to the Aloof than anyone in history. Why couldn't that be enough? For all Leila knew, her hosts might not even wake her again before Massa. What would she be giving up if she turned back now?

More to the point, what would Jasim expect of her? That she'd march on relentlessly, following her obsession to the end, or that she'd put her love for him first?

The possibilities multiplied in an infinite regress. They knew each other as well as two people could, but they didn't carry each other's minds inside them.

Leila drifted through the limbo of stars, wondering if Jasim had already made his decision. Having seen that the Aloof were not the torturers he'd feared, had he already set out for Tassef, satisfied that she faced no real peril at their hands? Or had he reasoned that their experience at this single node meant nothing? This was not the Amalgam, the culture could be a thousand times more fractured.

This cycle of guesses and doubts led nowhere. If she tried to pursue it to the end she'd be paralysed. There were no guarantees; she could only choose the least worst case. If she returned to Tassef, only to find that Jasim had gone on alone through the bulge, it would be unbearable: she would have lost him for nothing. If that happened, she could try to follow him, returning to the bulge immediately, but she would already be centuries behind him.

If she went on to Massa, and it was Jasim who retreated, at least she'd know that he'd ended up in safety. She'd know, too, that he had not been desperately afraid for her, that the Aloof's benign

indifference at this first node had been enough to persuade him that they'd do her no harm.

That was her answer: she had to continue, all the way to Massa. With the hope, but no promise, that Jasim would have thought the same way.

The decision made, she lingered in the scape. Not from any second thoughts, but from a reluctance to give up lightly the opportunity she'd fought so hard to attain. She didn't know if any member of the Aloof was watching and listening to her, reading her thoughts, examining her desires. Perhaps they were so indifferent and incurious that they'd delegated everything to insentient software, and merely instructed their machines to baby-sit her while she made up her mind where she wanted to go. She still had to make one last attempt to reach them, or she would never die in peace.

"Maybe you're right," she said. "Maybe you've watched us for the last million years, and seen that we have nothing to offer you. Maybe our technology is backwards, our philosophy naive, our customs bizarre, our manners appalling. If that's true, though, if we're so far beneath you, you could at least point us in the right direction. Offer us some kind of argument as to why we should change."

Silence.

Leila said, "All right. Forgive my impertinence. I have to tell you honestly, though, that we won't be the last to bother you. The Amalgam is full of people who will keep trying to find ways to reach you. This is going to go on for another million years, until we believe that we understand you. If that offends you, don't judge us too harshly. We can't help it. It's who we are."

She closed her eyes, trying to assure herself that there was nothing she'd regret having left unsaid.

"Thank you for granting us safe passage," she added, "if that's what you're offering. I hope my people can return the favour one day, if there's anywhere you want to go."

She opened her eyes and sought out her destination: deeper into the network, on towards the core.

## 10

The mountains outside the town of Astraahat started with a gentle slope that promised an easy journey, but gradually grew steeper. Similarly, the vegetation was low and sparse in the foothills, but became steadily thicker and taller the higher up the slope you went.

Jasim said, "Enough." He stopped and leant on his climbing stick.

"One more hour?" Leila pleaded.

He considered this. "Half an hour resting, then half an hour walking?"

"One hour resting, then one hour walking."

He laughed wearily. "All right. One of each."

The two of them hacked away at the undergrowth until there was a place to sit.

Jasim poured water from the canteen into her hands, and she splashed her face clean.

They sat in silence for a while, listening to the sounds of the unfamiliar wildlife. Under the forest canopy it was almost twilight, and when Leila looked up into the small patch of sky above them she could see the stars of the bulge, like tiny, pale, translucent beads.

At times it felt like a dream, but the experience never really left her. The Aloof had woken her at every node, shown her the view, given her a choice. She had seen a thousand spectacles, from one side of the core to the other: cannibalistic novae, dazzling clusters of newborn stars, twin white dwarfs on the verge of collision. She had seen the black hole at the galaxy's centre, its accretion disk glowing with X-rays, slowly tearing stars apart.

It might have been an elaborate lie, a plausible simulation, but every detail accessible from disk-based observatories confirmed what she had witnessed. If anything had been changed, or hidden from her, it must have been small. Perhaps the artifacts of the Aloof themselves had been painted out of the view, though Leila thought it was just as likely that the marks they'd left on their territory were so subtle, any way, that there'd been nothing to conceal.

Jasim said sharply, "Where are you?"

She lowered her gaze and replied mildly, "I'm here, with you. I'm just remembering."

When they'd woken on Massa, surrounded by delirious, cheering Eavesdroppers, they'd been asked: *What happened in there? What did you see?* Leila didn't know why she'd kept her mouth shut and turned to her husband before replying, instead of letting every detail come tumbling out immediately. Perhaps she just hadn't known where to begin.

For whatever reason, it was Jasim who had answered first. "Nothing. We stepped through the gate on Tassef, and now here we are. On the other side of the bulge."

For almost a month, she'd flatly refused to believe him. *Nothing? You saw nothing?* It had to be a lie, a joke. It had to be some kind of revenge.

That was not in his nature, and she knew it. Still, she'd clung to that explanation for as long as she could, until it became impossible to believe any longer, and she'd asked for his forgiveness.

Six months later, another traveller had spilled out of the bulge. One of the die-hard Listening Party pilgrims had followed in their wake and taken the short cut. Like Jasim, this heptapod had seen nothing, experienced nothing.

Leila had struggled to imagine why she might have been singled out. So much for her theory that the Aloof felt morally obliged to check that each passenger on their network knew what they were doing, unless they'd decided that her actions were enough to demonstrate that intruders from the disk, considered generically, were making an informed choice. Could just one sample of a working, conscious version of their neighbours really be enough for them to conclude that they understood everything they needed to know? Could this capriciousness, instead, have been part of a strategy to lure in more visitors, with the enticing possibility that each one might, with luck, witness something far beyond all those who'd preceded them? Or had it been part of a scheme to discourage intruders by clouding the experience with uncertainty? The simplest act of discouragement would have been to discard all unwelcome transmissions, and the most effective incentive would have been to offer a few plain words of welcome, but then, the Aloof would not have been the Aloof if they'd followed such reasonable dictates.

Jasim said, "You know what I think. You wanted to wake so badly, they couldn't refuse you. They could tell I didn't care as much. It was as simple as that."

"What about the heptapod? It went in alone. It wasn't just tagging along to watch over someone else."

He shrugged. "Maybe it acted on the spur of the moment. They all seem unhealthily keen to me, whatever they're doing. Maybe the Aloof could discern its mood more clearly."

Leila said, "I don't believe a word of that."

Jasim spread his hands in a gesture of acceptance. "I'm sure you could change my mind in five minutes, if I let you. But if we walked back down this hill and waited for the next traveller from the bulge, and the next, until the reason some of them received the grand tour and some didn't finally became plain, there would still be another question, and another. Even if I wanted to live for ten thousand years more, I'd rather move on to something else. And in this last hour ..." He trailed off.

Leila said, "I know. You're right."

She sat, listening to the strange chirps and buzzes emitted by creatures she knew nothing about. She could have absorbed every recorded fact about them in an instant, but she didn't care, she didn't need to know.

Someone else would come after them, to understand the Aloof, or advance that great, unruly, frustrating endeavour by the next increment. She and Jasim had made a start, that was enough. What they'd done was more than she could ever have imagined, back on Najib. Now, though, was the time to stop, while they were still themselves: enlarged by the experience, but not disfigured beyond recognition.

They finished their water, drinking the last drops. They left the canteen behind. Jasim took her hand and they climbed together, struggling up the slope side by side.

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