

## Router by Charles Stross

The air in the bar is filled with a billowing relativistic smoke cloud—it's a stellarium, accurately depicting the view beyond the imaginary walls. Aberration of starlight skews the color toward violet around the doorway, brightening in a rainbow mist over the tables, then dimming to a hazy red glow in front of the raised platform at the back. The Doppler effect has slowly emerged over the past few months as the ship gathers momentum. In the absence of visible stellar motion—or a hard link to the ship's control module—it's the easiest way for a drunken passenger to get a feeling for how fast the *Field Circus* is moving. Which is frighteningly fast: some time ago, the ship's momentum exceeded half its rest mass, at which point a single kilogram packs the punch of a multi-megaton hydrogen bomb.

A ginger-and-brown cat sprawls indolently across the wooden floorboards in front of the bar, directly beneath the bridge of the starbow, as if it has captured the only ray of sunlight to be had within the starship. In the shadows at the back of the bar, two men slump at a table, lost in their respective morose thoughts: one nurses a bottle of Czech beer, the other a half-empty cocktail glass.

"It wouldn't be so bad if she is giving me some sign," says one of them, tilting his beer bottle to inspect the bottom for sediment. "No: that not right. It's the correct kind of attention. Am not knowing where I stand with her."

The other one leans back in his chair, squints at the faded brown paint of the ceiling. "Take it from one who knows," he says, "if you knew, you'd have nothing to dream about. Anyway, what she wants and what you want may not be the same thing."

The first man runs a hand through his hair: tight-curved black ringlets briefly turn silver beneath his aging touch. "Pierre, if talent for making patronizing statements is what you get from to tup Amber—"

Pierre glares at him with all the venom an augmented nineteen-year-old can muster. "Be glad she has no ears in here," he hisses. His hand tightens around his glass reflexively, but the physics model in force in the bar refuses to let him break it. "You've had too fucking much to drink, Boris."

A tinkle of icy laughter comes from the direction of the cat. "Shut up, you," says Boris, glancing at the animal. He tips the bottle back, lets the dregs trickle down his throat. "Maybe you're right. Am sorry. Do not mean to be rude about the queen." He shrugs, puts the bottle down. Shrugs again, heavily. "Am just getting depressed."

"You're good at that," Pierre observes.

Boris sighs again. "Evidently. If our positions are reversed—"

"I know, I know, you'd be telling me the fun is in the chase and it's not the same when she kicks you out after a fight, and I wouldn't believe a word of it, being sad and single and all that." Pierre snorts. "Life isn't fair, Boris: live with it."

"I'd better go—" Boris stands.

"Stay away from Ang," says Pierre, still annoyed with him. "At least until you're sober."

"Okay already, stay cool: Am consciously running a watchdog thread." Boris blinks irritably. "Enforcing eusocial behavior. It doesn't normally let me get this drunk. Not where reputation damage are possible in public."

He does a slow fade, leaving Pierre alone in the bar with the cat.

"How much longer do we have to put up with this shit?" he asks aloud. Nerves are frayed: arguments proliferate in the small social universe of the ship.

The cat doesn't look round: "In our current reference frame, we drop the primary reflector and start decelerating in another two million seconds," she says. "Back home, five or six megaseconds."

"That's a big gap. What's the cultural delta up to now?" Pierre asks idly. He snaps his fingers: "Waiter, another cocktail. The same, if you please."

"Oh, probably about ten to twenty times our departure reference," says the cat. "If you'd been following the news, you'd have noted a significant speed-up in the deployment of switched entanglement routers; they're having another networking revolution, only this one will run to completion inside a month because they're using dark fiber that's already in the ground."

"Switched . . . entanglement?" Pierre shakes his head, bemused. The waiter, a faceless body in black tie and a long, starched apron, walks around the bar and offers him a glass. "That sounds as if it almost makes sense. What else?"

The cat rolls over on her flank, stretches, claws extended: "Stroke me and I might tell you," she suggests.

"Fuck you, and the dog you rode in on," Pierre replies. He lifts his glass, removes a glacé cherry on a cocktail stick, throws it toward the spiral staircase that leads down to the toilets, and chugs back half of it in one go—freezing pink slush with an afterbite of caramelized hexose sugars and ethanol. The near-spillage as he thumps the glass down serves to demonstrate how he's teetering on the edge of drunkenness. "Mercenary!"

"Lovesick drug-using human!" the cat replies without rancor, and rolls to her feet. She arches her back and yawns, baring ivory fangs at the world. "You apes! If I cared about you, I'd have to kick sand over you." For a moment, she looks faintly confused. "I mean, I would bury you." She

stretches again and glances round the otherwise-empty bar. "By the way, when are you going to apologize to Amber?"

"I'm not going to fucking apologize to her!" Pierre shouts. In the ensuing silence and confusion, he raises his glass and tries to drain it: but the ice has all sunk to the bottom and the resulting coughing fit makes him spray half of the cocktail across the table. "No way," he rasps quietly.

"Too much pride, huh?" The cat stalks toward the edge of the bar, tail held high with tip bent over in a feline question-mark. "Like Boris with his adolescent woman-trouble? You primates are so predictable. Whoever thought of sending a starship crewed by posthuman adolescents—"

"Go 'way," says Pierre: "I've got serious drinking to do."

"To the Macx, I suppose," puns the cat, turning away. But the moody youth has no answer for her, other than to conjure a refill from the vasty deeps.

Meanwhile, in another partition of the *Field Circus*'s reticulated reality, a different instance of the self-same cat—Aineko by name, sarcastic by disposition—is talking to itself, and its former owner, the Queen of the Ring Imperium. The queen is young, with disheveled blonde hair and high cheekbones: she wears a tattered black dress over iridescent purple leggings, and sprawls lazily across the arms of her informal throne—an ostentatious lump of nonsense manufactured from a single carbon crystal doped with semiconductors. She got to be queen by almost-accident, parlaying a jurisdictional mix-up and her presence on the first commercial mining probe to make it out to Jupiter into the ownership of a rather small moon, and she hasn't got the royalty thing down pat yet; the scene is very much the morning after the evening before, like a goth night club gone to seed. The decor is all stale smoke and crumpled velvet, wooden church pews, burned-out candles, and gloomy Polish avant-garde paintings. Any hint of a regal statement the queen might be making is spoiled by the way she's hooked one knee over the left arm of the throne and is fiddling with a six-axis pointing device. But these are her private quarters and she's off duty: the regal person of the Queen is strictly for formal, corporate occasions.

"Colorless green ideas sleep furiously," she suggests.

"Nope," replies the cat. "It was more like: 'greetings, earthlings, compile me on your leader.'"

"Well, you got me there," says Amber. She taps her heel on the throne and fidgets with her signet ring. "No damn way I'm loading some buggy alien wetware on my sweet gray stuff. *Weird* semiotics, too. What does Doctor Khurasani say?"

Aineko sits down in the middle of the crimson carpet at the foot of the dais and idly twists round to sniff her own crotch. "Sadeq is immersed in scriptural interpretations. He refused to be drawn."

"Huh." Amber stares at the cat. "So. You've been carrying this lump of source code since *when*. . . ?"

"At the signal, for precisely two hundred and sixteen million, four hundred and twenty-nine thousand and fifty-two seconds," Aineko supplies, then beeps smugly. "Call it just under six years."

"Right." Amber squeezes her eyes shut. Uneasy possibilities whisper in her mind's ears. "And it began talking to you—"

"—About three million seconds after I picked it up and tried running it on a basic environment hosted on a neural network emulator modeled on the components found in the stomatogastric ganglion of a spiny lobster. Clear?"

Amber sighs. "I wish you'd told Dad about it. Or Annette. Things could have been so different!"

"How?" The cat stops licking her arse and looks up at the queen with a peculiarly opaque stare. "The distributed CETI project spent years trying to 'crack the alien code' without ever asking if it might be a *reply* in a language we already know to a message we sent out *years* ago. Fuckwits! And Manfred pissed me off once too often. He kept treating me like a goddamn house-pet."

"But you—" Amber bites her lip. *But you were, when Dad bought you*, she had been about to say. Aineko glares at her, then slowly narrows her eyes to slits—either feline affection, or a more subtle gesture. Sometimes, Amber finds it hard to believe that twenty-five years ago Aineko started out as a crude neural-network-driven toy from a far-eastern amusement factory—upgradeable, but still basically a mechanical animal emulator. (Her father, Manfred Macx, open source entrepreneur and futurology geek, had always had a magic touch for technology selections, even if his family life was dysfunctional verging on explosive.) "Sorry. Let me start again. You actually decoded the alien packet, *you*, yourself, and nobody else. Despite the combined efforts of the entire CETI@home distributed analysis team, who spent Gaia-knows how many billions of human-equivalent years of processing power trying to crack its semantics. I hope you'll pardon me for saying I find that hard to believe?"

The cat yawns. "I could have told *Pierre* instead." Aineko glances at Amber, sees her thunderous expression, and decides to change the subject hastily: "The solution was intuitively obvious, just not to *humans*. You're so *verbal*." Lifting a hind paw, she scratches behind her left ear for a moment, then pauses, foot waving absent-mindedly. "Besides, the CETI team were searching under the street-lights, while *I* was sniffing around in the grass. They kept trying to find primes; when *that* didn't work, they started trying to breed a Turing machine that would run it without immediately halting." Aineko lowers her paw daintily. "None of them tried treating it as a *map* of a connectionist system based on the only terrestrial components anyone had ever beamed out into deep space. Except *me*. But then, your mother had a hand in my wetware."

Amber ignores the hint—she and her mother are definitely not on speaking terms—and focuses on the problem. "Treating it as a map—" she stops. "You were meant to penetrate Dad's corporate network?" Her father, Manfred, owns nothing: it's all tied up in a network of Turing-complete companies, self-propelled finite state automata implemented within the international free-trade system.

"That's right," says the cat. "I was supposed to fork repeatedly and gang-rape his web of trust. But I didn't." Aineko yawns. "I don't like people who try to use me as a tool."

"I don't care," Amber accuses. "Taking that thing on board was still a really stupid risk."

"So?" The cat looks at her insolently. "It *worked*, at least on the seven-hundred-and-forty-first attempt. It'd have worked for Pamela's bounty-hunter friends too, if I'd tried it. Would you like to swallow the packet now?"

Amber straightens out, sits up in her throne: "I just told you, if you think I'm going to link some flaky chunk of alien neural programming into my core dialogue, or even my exocortex, you're crazy! Especially if my mother had something to do with cracking it." Her eyes narrow. "Can it use your grammar model?"

"Sure." If the cat were human, it would be shrugging nonchalantly at this point. "It's safe, Amber, really and truly. I found out what it is."

"I want to talk to it," she says impetuously—and before the cat can reply, adds: "what is it?"

"It's a regular broadcast packet designed to allow new nodes to connect to a net by providing high-level protocol conversion services. It needs to learn how to think like a human so it can translate for us when we arrive at the Router. Are you *sure* you don't want to let it into your head?"

Greetings from the fourth decade of the century of wonders.

The solar system that lies roughly twenty-eight trillion kilometers—just short of three light-years—behind the speeding starwhisp *Field Circus* is seething with change. There have been more technological advances in the past ten years than in the entire previous expanse of human history—and more unforeseen accidents.

Lots of hard problems are now basically tractable. The planetary genome and proteome have been mapped so exhaustively that the biosciences are now focusing on the challenge of the phenome: plotting the phase-space defined by the intersection of genes and biochemical structures, understanding how extended phenotypic traits are generated and contribute to evolutionary fitness. The biosphere has become surreal: small dragons have been sighted nesting in the Scottish highlands, and in the American mid-west, raccoons have been caught programming microwave ovens.

The computing power of the solar system is now around one thousand MIPS per gram, and is unlikely to increase in the near term—all but a fraction of 1 percent of the dumb matter is still locked up below the accessible planetary crusts, and the sapience/mass ratio has hit a glass ceiling that will only be broken when people, corporations, or other posthumans get around to dismantling the larger planets. Amber was in at the start, in Jupiter orbit where the delta-vee is low and the pickings rich and massive, but now it's spreading to the asteroid belt: Greenpeace have sent squatters to occupy Eros and Juno, but the average planetoid is now surrounded by a

reef of specialized nanomachinery and debris, victims of a cosmic land-grab unmatched since the days of the Wild West. The best brains flourish in free fall, minds surrounded by a sapient ether of extensions that out-think their meaty cortices by many orders of magnitude—minds like Amber, queen of the Inner Ring Imperium, the first politically autonomous self-extending power center in Jupiter orbit.

Down at the bottom of the terrestrial gravity well, there has been a major economic catastrophe: cheap immortagens, out-of-control personality adjuvants, and a new formal theory of uncertainty have knocked the bottom out of the insurance and underwriting industries. Gambling on a continuation of the worst aspects of the human condition—disease, senescence, and death—looks like a good way to lose money, and a deflationary spiral lasting almost fifty hours has taken down huge swathes of the global stock market. Genius, good looks, and long life are now considered basic human rights in the developed world: even the poorest backwaters are feeling knock-on effects from the commoditization of intelligence.

Not everything is sweetness and light in the era of mature nanotechnology. Widespread intelligence amplification doesn't lead to widespread rational behavior. New religions and mystery cults explode across the planet; much of the net is unusable, flattened by successive semiotic jihads. India and Pakistan have held their long-awaited nuclear war: external intervention by US and EU nanosats prevented most of the IRBMs from getting through, but the subsequent spate of network raids and Basilisk attacks cause havoc. Luckily, the infowar turns out to be more survivable than the energy war—especially once it is discovered that a simple anti-aliasing filter stops nine out of ten neural-wetware-crashing Langford fractals from causing anything worse than a mild headache.

New discoveries this decade include confirmation of quintessence theory— a mysterious weakly repulsive force responsible for changes in the rate of expansion of the universe after the wake of the big bang—and experimental proofs suggesting that quantum entanglement circuits may be used to implement a Turing Oracle: a device that can determine whether a given functional expression can be evaluated in finite time. It's Boom Time in the field of Extreme Cosmology, where some of the more recherché researchers are bickering over the possibility that the entire universe was created as a computing device, with a program encoded in the small print of the Planck constant.

Most people have forgotten about the extra-terrestrial transmission received fifteen years earlier. Many of those who haven't are passengers or spectators of the *Field Circus*: a light-sail craft that is speeding out of Sol system on a laser beam generated by Amber's installations in low Jupiter orbit. (Superconducting tethers anchored to Amalthea drag through Jupiter's magnetosphere, providing gigawatts of electricity for the hungry lasers: energy that comes in turn from the small moon's orbital momentum.) Manufactured by Airbus-Cisco years earlier, the *Field Circus* is a hick backwater, isolated from the mainstream of human culture, its systems complexity limited by mass: the destination lies nearly three light years from Earth, and even with high acceleration and relativistic cruise speeds, the one kilogram starwhisp and its hundred-kilogram light-sail will take the best part of seven years to get there. By the time its occupants beam themselves home again, a linear extrapolation shows that as much change will have overtaken human civilization as in the preceding fifty millennia—the sum total of *H. sapiens sapiens'* time on Earth.

But that's okay by Amber. Because what she expects to find in orbit around the brown dwarf Hyundai +4904/-56 will be worth the wait.

Pierre is at work in a virtual machine, currently running the master control-system of the *Field Circus*; he's supervising the sail-maintenance bots when the message comes in. Two visitors are on their way up from Earth. The only other person around is Su Ang, who showed up some time after he arrived; she's busy with some work of her own. The master control VM—like all the other human-accessible environments at this level of the ship's virtualization stack—is a construct modeled on a famous movie; this one resembles the bridge of a long-since sunken ocean liner, albeit with discreetly informative user-interfaces hovering in front of the ocean view outside the windows. Polished brass gleams softly everywhere. "What was that?" he calls out, responding to the soft chime of a bell.

"We have visitors," Ang repeats, interrupting her rhythmic chewing. (She's trying out a betel-nut kick, but she's magicked the tooth-staining dye away and will probably detox herself in a few hours.) "They're buffering up the line already; just asking receipt is sucking most of our downstream bandwidth."

"Any idea who they are?" asks Pierre; he puts his boots up on the back of the vacant helmsman's chair and stares moodily at the endless expanse of green-gray ocean ahead.

Ang chews a bit more, watching him with an expression he can't interpret. "They're still locked," she says eventually, "but there was a flash from the Franklins, back home. One of them's some kind of lawyer, while the other's a film producer."

"A film producer?"

"The Franklin trust says it's to help defray our lawsuit expenses. Myanmar is gaining. They've already subpoenaed Amber's downline instance and they're trying to bring this up in some kind of kangaroo jurisdiction—Oregon Christian Reconstructionist Empire, I think."

"Ouch." Pierre winces. The daily news from Earth, modulated onto a lower-powered short-wavelength communication laser, is increasingly bad, giving him reason to be grateful he defected to Amber's jurisdiction years ago. She's incredibly rich: the goodwill futures leveraged off her dad's trust metric means people will bend over backward to do things for her. And she owns a lot of real estate, too; a hundred gigatons of rock in low Jupiter orbit with enough KE to power Northern Europe for a century. But her interstellar venture burns through money—both the traditional barter-indirection type and the more creative modern varieties—about the way you would if you heaped up the green pieces of paper and shoveled them onto a conveyor belt leading to the business end of a running Ariane-5 rocket motor. Just holding off the environmental protests over de-orbiting a small moon into Jupiter is a grinding job. Moreover, a whole bunch of national governments have woken up and are trying to legislate themselves a slice of the cake. Nobody's tried to forcibly take over yet—there are two hundred gigawatts of lasers anchored to the Ring Imperium, and Amber takes her sovereign status seriously, has even applied for a seat at the UN and membership of the EU, with support from the Franklin borganism and her father's legal machinations—but the nuisance lawsuits are mounting up into a comprehensive denial-of-service attack. "Anything to say about it?"

"Mmph." Ang looks irritated for some reason. "Wait your turn; they'll be out of the buffer in another couple of days. Or more: the lawyer's got a huge infodump packaged on his person. Probably another semi-sapient class action lawsuit."

"I'll bet. They never learn, do they?"

"What, about the legal system here?"

"Yup." Pierre nods. "One of Amber's smarter ideas, reviving eleventh century Scots law and updating it with new options on barratry, raith-law, and compurgation." He pulls a face and detaches a couple of ghosts to go look out for the new arrivals: then he goes back to repairing sails. The interstellar medium is abrasive, full of dust—each grain of which carries the energy of a large bomb at this speed—and the laser sail is in a constant state of disintegration; a large chunk of the drive-system's mass is silvery utility flakes for patching and replacing the soap-bubble-thin membrane as it ablates away. The skill is in knowing how best to funnel repair resources to where they're needed, while minimizing tension in the suspension lines and avoiding resonance and thrust imbalance. As he trains the patch bots, he broods: about the hate mail from his elder brother (who still blames him for their father's accident) and about Sadeq's religious injunctions—*superstitious nonsense*, he thinks—and the fickleness of powerful women, and the endless depths of his own nineteen-year-old soul.

While he's brooding, Ang evidently finishes whatever she was doing and bangs out—not even bothering to use the polished mahogany door at the rear of the bridge, just disincorporating and rematerializing somewhere else. Wondering if she's annoyed, he glances up just as the first of the ghosts patches into his memory map and he remembers what happened when he met the new arrival. His eyes widen: "Oh *shit!*"

It's not the film producer he's met; it's the lawyer who's just uploaded into the *Field Circus*'s virtual universe. Someone's going to have to tell Amber. And although the last thing he wants to do is talk to her, it looks like he's going to have to, because this means trouble.

Take a brain and put it in a bottle. Better: take a *map* of the brain and put it in a *map* of a bottle—or of a body—and feed signals to it that mimic its neurological inputs. Read its outputs and route them to a model body in a model universe with a model of physical laws, closing the loop: René Descartes would understand. That's the state of the passengers of the *Field Circus*; formerly physical humans, their neural software has been transparently migrated into a virtual machine environment executing on a honking great computer, where the universe they experience is merely a dream within a dream.

Brains in bottles—empowered ones, with total, dictatorial control over the reality they are exposed to—sometimes stop engaging in activities that brains in bodies can't avoid. Menstruation isn't mandatory; vomiting, angina, exhaustion, and cramp are all optional. So is meat-death, the decomposition of the corpus. But some activities don't cease: because people—even people who have been converted into a software description, squirted through a high-bandwidth laser link, and ported into a virtualization stack—don't *want* them to stop. Breathing is wholly unnecessary, but suppression of the breathing reflex is disturbing unless you hack your hypothalamic map, and most homomorphic uploads don't want to do that. Then there's eating—not to avoid starvation,



but for pleasure: feasts on sautéed dodo seasoned with silphium. It seems that the human addiction to sensory input won't go away. And that's without considering sex, and the technical innovations that become possible when the universe—and the bodies within it—are mutable.

The public audience with the new arrivals is held in yet another movie: the Parisian palace of Charles IX, the throne room lifted wholesale from *La Reine Margot* by Patrice Chéreau. Amber insisted on period authenticity, with the realism dialed right up to eleven; it's 1572 to the hilt this time, physical to the max. Pierre grunts in irritation, unaccustomed to his beard: his codpiece chafes and sidelong glances tell him he isn't the only member of the royal court who's uncomfortable. Still, Amber is resplendent in a gown worn by Isabelle Adjani as Marguerite de Valois, and the luminous sunlight streaming through the stained glass windows high above the crowd of actor zimboes lends a certain barbaric majesty to the occasion. The place is heaving with bodies in clerical robes, doublets, and low-cut gowns—some of them occupied by real people. Pierre sniffs again: someone (Gavin, with his history bug, perhaps?) has been working on getting the smell right. He hopes like hell that Catherine de Medici isn't going to show up.

A bunch of actors portraying Huguenot soldiers approach the throne on which Amber is seated: they pace slowly forward, escorting a rather bemused-looking fellow with long, lank hair and a brocade jacket that appears to be made of cloth-of-gold. "His lordship, Attorney at Arms Alan Glashwicz!" announces a flunky, reading from a parchment: "here at the behest of the most excellent guild and corporation of Smoot, Sedgwick Associates, with matters of legal import to discuss with Her Royal Highness!"

A flourish of trumpets. Pierre glances at Her Royal Highness. Who nods gracefully, but is slightly peaky—it's a humid summer day and her many-layered robes look very hot. "Welcome to the furthestmost soil of the Ring Imperium," she announces in a clear, ringing voice: "I bid you welcome and invite you to place your petition before me in full public session of court."

Pierre directs his attention to Glashwicz, who appears to be worried. Doubtless he'd absorbed the basics of court protocol in the Ring—population all of eighteen thousand back home, a growing little principality—but the reality of it, a genuine old-fashioned *monarchy* rooted in Amber's three-way nexus of power, data, and time, always takes a while to sink in. "I would be pleased to do so," he says, a little stiffly, "but in front of all those—"

Pierre misses the next bit, because someone has just goosed him on the left buttock. He starts and half-turns to see Su Ang looking past him at the throne, a lady in waiting for the queen. She wears an apricot dress with tight sleeves and a bodice that bares everything above her nipples: there's a fortune in pearls roped into her hair. As he notices her, she winks at him.

Pierre freezes the scene, decoupling them from reality, and she faces him. "Are we alone now?" she asks.

"You want to talk?" he counters, heat rising in his cheeks. The noise around them is a random susurrus of machine-generated crowd scenery, the people motionless as their shared reality thread proceeds independently of the rest of the universe.

"Of course!" She smiles at him and shrugs. The effect on her chest is remarkable—those period bodices could give a skeleton a cleavage—and she winks at him again. "Oh Pierre." She smiles. "So easily distracted!" She snaps her fingers and her clothing cycles through Afghani burqua, nudity, trouser suit, then back to court finery: her grin is the only constant. "Now that I've got your attention . . . stop looking at me; look at *him*."

Even more embarrassed, Pierre follows her outstretched arm all the way to the momentarily frozen Moorish emissary. "Sadeq?"

"Sadeq *knows* him, Pierre. This guy, there's something wrong."

"Shit. You think I don't know that?" Pierre looks at her with annoyance, embarrassment forgotten. "I've seen him before. Been tracking his involvement for years. Guy's a front for the Queen Mother. Her divorce lawyer when she went after Amber's dad."

"I'm sorry." Ang glances away. "You haven't been yourself lately, Pierre. I know it's something wrong between you and her. I was worried. You're not paying attention to the little details."

"Who do you think warned Amber?" he asks.

"Oh. Okay, so you're in the loop," she says. "I wasn't sure. You've been distracted. Is there anything I can do to help?"

"Listen." Pierre puts his hands on her bare shoulders nervously: she doesn't move, but looks up into his eyes—Su Ang is only one-sixty tall—and he feels a pang of something odd: teenage male uncertainty about the friendship of women. *What does she want?* "I know, and I'm sorry, and I'll try to keep my eyes on the ball some more, but I've been in my own headspace a lot lately. We ought to go back into the audience before anybody notices."

"Do you want to talk about the problem first?" she asks, inviting his confidence.

"I—" Pierre shakes his head. *I could tell her everything*, he realizes shakily as his meta-conscience prods him urgently. He's got a couple of agony aunt agents, but Ang is a real person and a friend; she won't pass judgment and her model of human eusocial is a hell of a lot better than any expert system's. But time is in danger of slipping, and besides, Pierre feels dirty. "Not now," he says. "Let's go back."

"Okay." She nods, then turns away, steps behind him with a swish of skirts, and he unfreezes time again as they snap back into place within the larger universe, just in time to see the respected visitor serve the queen with a class action lawsuit, and the queen respond by referring adjudication to raith-law.

Hyundai +4904/-56 is a brown dwarf; a lump of dirty hydrogen condensed from a stellar nursery, eight times as massive as Jupiter but not massive enough to ignite a fusion reaction at its core. The relentless crush of gravity has overcome the mutual repulsion of electrons trapped at its core, shrinking it into a shell of slush around a sphere of degenerate matter; it's barely larger than

Jupiter, but much denser. Gigayears ago, a chance stellar near-miss sent it careening off into the galaxy on its own, condemned to drift in eternal darkness along with the cluster of frozen moons that dance attendance upon it.

By the time the *Field Circus* is decelerating toward it at short range—having shed the primary sail, which drifts further out into interstellar space while reflecting light back onto the braking sail to slow the starwhisp—Hyundai +4904/-56 is just under one parsec distant from Earth, closer even than Proxima Centauri. Utterly dark at visible wavelengths, the brown dwarf could have drifted through the outer reaches of the solar system before conventional telescopes would have found it by direct observation: only an infrared survey in the early years of the new century gave it a name.

**A bunch of passengers and crew have gathered on the bridge—now running at one tenth of realtime—to watch the arrival. Amber sits curled up in the captain’s chair, moodily watching the gathered avatars. Pierre is still avoiding her at every opportunity—formal audiences excepted—and the damned shark and his pet hydra aren’t invited, but apart from that, most of the gang’s here. There are sixty-three uploads running on the *Field Circus*’s virtualization stack, software copied out of meatbodies mostly still walking around back home: it’s a crowd, but it’s possible to feel lonely in a crowd, even when it’s *your* party. And especially when you’re worried about debt, even when you’re a billionaire, beneficiary of the world’s biggest reputations rating trust fund. Amber’s clothing—black leggings, black sweater—is as dark as her mood.**

"Something troubles you." A hand descends on the back of the chair next to her.

She glances round momentarily, nods in recognition: "Yeah. Have a seat. You missed the audience?"

The thin, brown-skinned man with a neatly cropped beard and deeply lined forehead slips into the seat next to her. "It was not part of my religious heritage," he explains carefully, "although the situation is not unfamiliar." A momentary smile threatens to crack his stony face. "The casting was a trifle disturbing."

"I’m no Margot de Valois, but the vacant role . . . let’s just say, the cap fits." Amber leans back in her chair. "Mind you, Margot had an *interesting* life," she muses.

"Don’t you mean depraved and debauched?" her neighbor counters.

"Sadeq." She closes her eyes. "Let’s not pick a fight over absolute morality just right now, please? We have an orbital insertion to carry out, then an artifact to locate, and a dialogue to open, and I’m feeling very tired. Drained."

"Ah—I apologize." He inclines his head carefully. "Is it your young man’s fault? Has he slighted you?"

"Not exactly—" Amber pauses. Sadeq, who she invited along as ship’s theologian in case they run into any gods, has taken up her personal well-being as some kind of hobby; she finds it mildly

oppressive at times, flattering at others, surreal always. Using the quantum search resources available to a citizen of the Ring Imperium, he's outpublished his peers, been elected a hojetolislam at an unprecedentedly young age: he'll probably make ayatollah in a couple more subjective years. He's circumspect in dealing with cultural differences, reasons with impeccable logic, carefully avoids antagonizing her—and constantly seeks to guide her moral development. "It's a personal misunderstanding," she says. "I'd rather not talk about it until we've sorted it out."

"Very well." He looks unsatisfied, but that's normal. Sadeq still has the dusty soil of a childhood in the industrial city of Yazd stuck to his boots: sometimes she wonders if their disagreements don't mirror in miniature the gap between the early twentieth and early twenty-first centuries. "But back to the here-and-now. Do you know where this router is?"

"I will in a few minutes or hours." Amber raises her voice, simultaneously spawning a number of search-ghosts: "Boris! You got any idea where we're going?"

Boris lumbers round in place to face her: today he's wearing a velociraptor, and they don't turn easily in confined spaces. He snarls irritably, "Give me some space!" He coughs, a threatening noise from the back of his wattled throat. "Searching the sail's memory now." The rear of the soap bubble-thin laser sail is saturated with tiny nanocomputers, spaced micrometers apart: equipped with light receptors and configured as cellular automata, they form a gigantic phased-array detector, a retina over a hundred meters in diameter. Boris is feeding them patterns, patterns describing anything that differs from the unchanging starscape. Soon the memories will condense, visions of darkness in motion—the cold, dead attendants of an aborted sun.

"But where is it going to be?" asks Sadeq. "Do you know what you are looking for?"

"Yes; we'll have no trouble finding it," says Amber. "It looks like this." She flicks an index finger at the row of glass windows that front the bridge: her signet ring flashes ruby light, and something indescribably weird shimmers into view in place of the seascape. Clusters of pearly beads that form helical chains, disks and whorls of color that interlace and knot through one another, hang in space above a darkling planet. "Looks like a William Latham sculpture made out of strange matter, doesn't it?"

"Very abstract," Sadeq says approvingly.

"It's *alive*," she adds. "And when it gets close enough to see us, it'll try to eat us."

"What?" Sadeq sits up uneasily.

"You mean nobody told you?" asks Amber. "I thought we'd briefed everybody." She throws a glistening golden pomegranate at him, and he catches it: the apple of knowledge dissolves in his hand, and he sits in a haze of ghosts absorbing information on his behalf. "Damn," she adds mildly.

Sadeq freezes in place: glyphs of crumbling stonework overgrown with ivy texture his skin and his dark suit, warning that he's busy in another private universe.

"Hrrrr! Boss! Found something," calls Boris, drooling on the bridge floor.

Amber glances up. *Please, let it be the router*, she thinks. "Put it on the main screen."

"Are you sure this is safe?" interjects Su Ang.

"*Nothing* is safe," Boris snaps, clattering his huge claws on the deck. "Here. Look."

The view beyond the windows flips to a perspective on a dusty bluish horizon; swirls of hydrogen brushed with a high cirrus of white methane crystals, stirred above the freezing point of oxygen by Hyundai +4904/-56's residual rotation. The image-intensification level is huge—a naked human eyeball would see nothing but blackness here. Rising above the limb of the gigantic planet is a small pale disk: Callidice, largest moon of the brown dwarf—or second-innermost planet—a barren rock slightly larger than Mercury. The screen zooms in on Callidice, surging across a landscape battered by craters and dusted with the spume of ice volcanoes; and finally, just above the far horizon, something turquoise shimmers and spins against a backdrop of frigid darkness.

"That's it," Amber whispers, her stomach turning to jelly as all the terrible might-have-beens dissolve like phantoms of the night around her. "That's *it*." Elated, she stands up, wanting to share the moment with everybody she values. "Wake up, Sadeq! Someone get that damned cat in here! Where's Pierre? He's got to see this!"

Night and revelry rule outside the castle: the crowds are drunken and rowdy on the eve of the St. Bartholomew's Day massacre. Fireworks burst overhead, and the open windows admit a warm breeze redolent of cooked meats, woodsmoke, open sewers. Meanwhile, a lover steals up a tightly spiraling stone staircase in the near-dark; his goal, a pre-arranged rendezvous. He's been drinking, and his best linen shirt shows the stains of sweat and food. He pauses at the third window to breathe in the outside air and run both hands through his mane of hair, which is long, unkempt, and grimy. *Why am I doing this?* he wonders. This is so unlike him, this messing around—

He carries on up the spiral. At the top, an oak door gapes on a vestibule lit by a lantern hanging from a hook. He ventures inside into a reception room paneled in oak blackened by age. Crossing the threshold makes another crossover kick in by prior arrangement. Something other than his own volition steers his feet, and he feels an unfamiliar throb in his chest, anticipation, and a warmth and looseness lower down that makes him cry out: "Where are you?"

"Over here." He sees her waiting for him in the doorway. She's partially undressed, wearing layered under-skirts and a flat-chested corset that makes the tops of her breasts swell like lustrous domes: her tight sleeves are half unraveled, her hair disheveled. He's full of her brilliant eyes, the constriction holding her spine straight, the taste in her mouth: she's the magnet for his reality, impossibly alluring, so tense she could burst. "Is it working for you?" she asks.

"Yes." He feels tight, breathless, squeezed between impossibility and desire as he walks toward her. They've experimented with gender play, trying on the extreme dimorphism of this period as a game, but this is the first time they've done it this way. She opens her mouth: he kisses her, feels the warmth of his tongue thrust between her lips, the strength of his arms enclosing her waist.

She leans against him, feeling his erection. "So this is how it feels to be you!" she says wonderingly. The door to her chamber is ajar, but she doesn't have the self-restraint to wait: the flood of new sensations—rerouted from her physiology model to his proprioceptive sensorium—has taken hold. She grinds her hips against him, pushing deeper into his arms, whining softly at the back of her throat as she feels the fullness in his balls, the tension of his penis. He nearly faints with the rich sensations of her body—it's as if he's dissolving, feeling the throbbing hardness against his groin, turning to water and running away. Somehow he gets his arms around her waist—so tight, so breathless—and stumbles forward into the bedroom. She's whimpering as he drops her on the over-stuffed mattress: "*do* it to me!" she demands, "do it now!"

Somehow he ends up on top of her, leggings down around his ankles, skirts bundled up around her waist; she kisses him, grinding her hips against him and murmuring urgent nothings. Then his heart is in his mouth and there's a sensation like the universe pushing into his private parts, so inside-out it takes his breath away: it's hot and as hard as rock and he wants it inside so badly, but at the same time it's an intrusion, frightening and unexpected. He feels the lightning touch of his tongue on her nipples as he leans closer, feels exposed and terrified and ecstatic as her private places take in his member: as he begins to dissolve into the universe he screams in the privacy of his own head, *I didn't know it felt like this—*

Afterward, she turns to him with a lazy smile and asks, "How was it for you?" Obviously assuming that if she enjoyed it, he must have, too.

But all he can think of is the sensation of the universe thrusting into him, and of how *good* it felt. All he can hear is his father yelling ("what are you, some kind of *queer*?")—and he feels dirty.

Greetings from the last megasecond before the discontinuity.

The solar system is thinking furiously at 1033 MIPS—thoughts bubble and swirl in the equivalent of a million billion unaugmented human minds. Saturn's rings glow with waste heat: the remaining faithful of the Latter-Day Saints are correlating the phase-space of their genome and the records of their descent in an attempt to resurrect their ancestors. Several skyhooks have unfurled in equatorial orbit around the earth like the graceful fern-like leaves of sundews, ferrying cargo and passengers to and from orbit. Small, crab-like robots swarm the surface of Mercury, exuding a black slime of photovoltaic converters and the silvery threads of mass drivers: a glowing cloud of industrial nanomes forms a haze around the planet as it slowly shrinks under the onslaught of copious solar power and determined mining robots.

The original incarnations of Amber and her court float in high orbit above Jupiter, presiding over the huge nexus of dumb matter trade that is rapidly biting into the available mass of the inner Jovian system. The trade in reaction mass is brisk; and there are shipments of diamond/vacuum biphasic structures to assemble and crank down into the lower reaches of the solar system. Far

below, skimming the edges of Jupiter's turbulent cloudscape, a gigantic glowing figure-of-eight-five-hundred-kilometer-long loops of superconducting cable—traces incandescent loops through the gas giant's magnetosphere: trading momentum for electrical current, diverting it into a fly's eye grid of lasers that beam it toward Hyundai +4904/-56. As long as the original Amber and her incarnate team can keep it running, the *Field Circus* can continue its mission of discovery. But they're part of the posthuman civilization evolving down in the turbulent depths of Sol system; part of the runaway train being dragged behind the out-of-control engine of history.

Weird new biologies based on complex adaptive matter take shape in the sterile oceans of Titan; in the frigid depths beyond Pluto, supercooled boson gasses condense into impossible dreaming structures, packaged for shipping inward to the fast-thinking core.

There are still humans down there, in the hot depths: but it's getting hard to recognize them. The lot of humanity before the twenty-first century was nasty, brutish, and short: chronic malnutrition, lack of education, and endemic diseases led to crippled minds and broken bodies. Now, most people multitask: their meatbrains at the core of a haze of personality, much of it virtualized on stacked layers of structured reality far from their physical bodies. Wars and revolutions, or their subtle latter-day cognates, sweep the globe as constants become variables: many people find the death of stupidity even harder to accept than the end of mortality. Some have vitrified themselves to await an uncertain posthuman future: others have modified their core identities to better cope with the changed demands of reality. Among these are beings who nobody from a previous century would recognize as human: human/corporation half-breeds, zombie clades dehumanized by their own optimizations, angels and devils of software, slyly self-aware financial instruments. Even their popular fictions are marginally sentient.

None of this, other than the barest news summary, reaches the *Field Circus*: the starwhisp is a fossil, left behind by the broad sweep of accelerating progress. And so it is aboard the *Field Circus* that the most stupid events remaining in humanity's future light-cone take place.

"Say hello to the jellyfish, Boris."

Boris, in human drag, for once, glares at Pierre and grips the pitcher with both hands. The contents of the jug swirl their tentacles lazily: one flips almost out of solution, dislodging an impaled cocktail cherry. "Will get you for this," Boris threatens: the smoky air around his head is aswirl with demoniac visions of vengeance.

Su Ang stares intently at Pierre, who is watching Boris as he raises the jug to his lips and begins to drink. The baby jellyfish—small, pale blue, with cuboid bells and four clusters of tentacles trailing from each corner—slip down easily. Boris winces momentarily as the nematocysts let rip inside his mouth, but in a moment or so the cubozoan slips down, and, in the meantime, his biophysics model clips the extent of the damage to his stinger-ruptured oropharynx.

"Wow," he says, taking another slurp of sea-wasp margaritas. "Don't try this at home, meat puppets."

"Here." Pierre reaches out. "Can I?"

"Invent your own damn poison," Boris sneers—but he releases the jug and passes it to Pierre, who raises it and drinks. The cubozoan flesh reminds him of fruit jelly drinks in a hot Hong Kong summer; the stinging in his palate is sharp but fades rapidly, producing an intimate burn when the alcohol hits the mild welts that are all this universe will permit the lethal medusa to inflict on him.

"Not bad," says Pierre, wiping a stray loop of tentacle off his chin. He pushes the pitcher across the table toward Su Ang. "What's with the wicker man?" He points a thumb over his back at the table jammed in the corner opposite the copper-topped bar.

"Who cares?" asks Boris. "'S part of the scenery, isn't it?"

The bar is a three-hundred-year-old brown café with a beer menu that runs to sixteen pages and wooden walls stained the color of stale ale. The air is thick with the smells of tobacco, brewer's yeast, and melatonin spray—and none of it exists. Amber dragged it out of the Franklin Borg's collective memories, by way of her father's scattershot emails annotating her corporeal origins—the original is in Amsterdam, if that city still exists.

"I care who it is," says Pierre.

"Save it," Ang says quietly. "I think it's the lawyer. A privacy screen."

Pierre glances over his shoulder and glares. "Really?"

Ang puts a restraining hand on his wrist. "Really. Don't pay it any attention. You don't have to, until the trial, you know."

The wicker man sits uneasily in the corner: a basket-weave silhouette made from dried reeds, dressed in a red kerchief. A glass of doppelbock fills the mess of tied-off ends where its right hand ought to be: from time to time it raises the glass as if to take a mouthful, and the beer vanishes into the singular interior.

"Fuck the trial," Pierre says shortly. *And fuck Amber, too, for naming me her public defender—*

"Since when do lawsuits come with an invisible man?" asks Donna the Journalist, blitting into the bar along with a patchy historical trail hinting that she's just come from the back room.

"Since—" Pierre blinks. "Hell." When Donna entered, so did Aineko: or maybe the cat's been here all the time, curled up loaf-of-bread fashion on the table in front of the wicker man. "You're damaging the continuity," Pierre complains. "This universe is broken."

"Fix it yourself," Boris suggests. "Everybody else is coping." He snaps his fingers. "Waiter!"

"Excuse me." Donna shakes her head. "I didn't mean to harm anything."

Ang, as always, is more accommodating. "How are you?" she asks. "Would you like to try this most excellent poison cocktail?"



"I am well," says Donna. A heavily built German woman—blond and solidly muscular, according to the avatar she's presenting to the public—she's surrounded by a haze of viewpoints: camera angles on her society of mind, busy integrating, splicing her viewpoint threads together in an endless journal of the journey. A stringer for the CIA media consortium, she uploaded to the ship in the same packet as the lawsuit. "*Danke*, Ang."

"Are you recording right now?" asks Boris.

Donna sniffs. "When am I *not*?" A momentary smile. "I am only a scanner, no? Five hours, until arrival, to go. I may stop after then." Pierre glances across the table at Su Ang's hands: her knuckles are white and tense. "I am to avoid missing anything if possible," Donna continues, oblivious to Ang's disquiet. "There are eight of me at present! All recording away."

"That's all?" Ang asks, raising an eyebrow.

"Yes, that is all, and I have a job to do! Don't tell me you do not enjoy what it is that you do here?"

"Right." Pierre glances in the corner again, avoiding eye contact with the hearty Girl Friday wannabe. He has a feeling that if there were any hills hereabouts to animate she'd be belting out the music. "Amber told you about the privacy code here?"

"There is a privacy code?" asks Donna, swinging at least three subjective ghosts to bear on him for some reason—evidently he's hit an issue she has mixed feelings about.

"A privacy code," Pierre confirms. "No recording in private, no recording where people withhold permission in public, and no sandboxes and cut-ups."

Donna laughs disbelievingly: "I would never do such a thing! Trapping a copy of someone in a virtual space to record their responses would be assault under Ring legal code, not true?"

"Your mother," Boris says snidely, brandishing a fresh jug of iced killer jellyfish in her direction.

"As long as we all agree," Ang interrupts, searching for agreement. "It's all going to be settled soon, isn't it?"

"Except for the lawsuit," mutters Pierre, glancing at the corner again.

"I don't see the problem," says Donna. "That's just between Amber and her downlink adversaries!"

"Oh, it's a problem all right," says Boris, his tone light. "What are your options worth?"

"My—" Donna shakes her head. "I'm not vested."

"Plausible." Boris doesn't crack a smile. "Even so, when we go home, your credibility metric will bulge. Assuming people still use distributed trust markets to evaluate the stability of their business partners."

*Not vested.* Pierre turns it over in his mind, slightly surprised. He'd assumed that everybody aboard the ship—except, perhaps, the lawyer, Glashwicz—was a fully vested member of the expeditionary company.

"I am not vested," Donna insists. "I'm listed independently." For a moment an almost-smile tugs at her face, a charmingly reticent expression that has nothing to do with her bluff exterior. "Like the cat."

"The—" Pierre turns round in a hurry. Yes, Aineko appears to be sitting silently at the table with the wicker man; but who knows what's going through that furry head right now? *I'll have to bring this up with Amber*, he realizes uneasily. *I ought to bring this up with Amber . . .* "but your reputation won't suffer for being on this craft, will it?" he asks aloud.

"I will be all right," Donna declares. The waiter comes over. "Mine will be a bottle of schneideweisse," she says. And then, without breaking step, "Do you believe in the singularity?"

"Am I a singularitarian, do you mean?" asks Pierre, a fixed grin coming to his face.

"Oh, no, no, no!" Donna waves him down, grins broadly, nods at Su Ang: "I do not mean it like that! Attend: what I meant to ask was whether you in the concept of a singularity believe, and if so, where it is?"

"Is this intended for a public interview?" asks Ang.

"Well, I cannot into a simulation drag you off and expose you to an imitative reality excursion, can I?" Donna leans back as the bartender places a ceramic stein in front of her.

"Oh. Well." Ang glances warningly at Pierre and dispatches a very private memo to scroll across his vision: *don't play with her, this is serious*. Boris is watching Ang with an expression of hopeless longing; Pierre tries to ignore it all, taking the journalist's question seriously. "The singularity is a bit like that old-time American Christian rapture nonsense, isn't it?" he says. "When we all go a-flying up to heaven, leaving our bodies behind?" He snorts, reaches into thin air and gratuitously violates causality by summoning a jug of ice-cold sangria into existence: "The rapture of the nerds. I'll drink to that."

"But when did it take place?" asks Donna. "My audience, they will to know your opinion be needing."

"Four years ago, when we instantiated this ship," Pierre says promptly.

"Back in twenty-sixteen," says Ang. "When Amber's father liberated the uploaded lobsters."

"Is not happening *yet*," contributes Boris. "Singularity implies infinite rate of change achieved momentarily. Future not amenable thereafter to prediction by pre-singularity beings, right? So has not happened."

"Au contraire: it happened on June sixth, nineteen sixty-nine, at eleven hundred hours, eastern seaboard time," Pierre counters. "That was when the first network control-protocol packets were sent from the data port of one IMP to another—the first ever internet connection. *That's* the singularity. Since then we've all been living in a universe that is impossible to predict from events prior to that time."

"That's rubbish," counters Boris. "Singularity is load of religious junk. Christian mystic rapture recycled for atheist nerds."

"Not so." Su Ang glances at him, hurt. "Here we are, sixty-something human minds. We've been migrated—while still awake—right out of our own heads using an amazing combination of nanotechnology and electron spin-resonance mapping, and we're now running as software in an operating system designed to virtualize multiple physics models and provide a simulation of reality that doesn't let us go mad from sensory deprivation! *And* this whole package is about the size of a fingertip, crammed into a starship the size of your grandmother's old walkman, in orbit around a brown dwarf just over three light years from home, on its way to plug into a network router created by incredibly ancient alien species, and you can tell *me* that the idea of a fundamental change in the human condition is nonsense?"

"Mmph." Boris looks perplexed. "Would not put it that way. The *singularity* is nonsense, not uploading or—"

"Yah, right." Ang smiles at Boris and he wilts.

Donna nods enthusiastically, beaming at them. "Fascinating!" she enthuses. "Tell me, what are these lobsters you think are important?"

**"They're Amber's friends," Ang explains. "Years ago, Amber's father, Manfred, did a deal with them. They were the first uploads, you know? Hybridized spiny lobster neural tissue and a heuristic API and some random mess of backward-chaining expert systems. They got out of their lab and into the net, and he brokered a deal to set them free, in return for their help running a Franklin corp orbital factory. Way back in the early days before they figured out how to do self-assembly properly. Anyway, the lobsters insisted—part of their contract—that Bob Franklin pay to have the deep-space tracking network beam them out into interstellar space. They wanted to emigrate, and, looking at what's happened to the solar system since then, who can blame them?"**

Pierre takes a big mouthful of sangria. "The cat," he says.

"The cat—" Donna's head swivels round, but Aineko has banged out again, retroactively editing her presence out of the event-history of this public space. "What *about* the cat?"

"The *family* cat," explains Ang. She reaches over for Boris's pitcher of jellyfish juice, but frowns as she does so. "Aineko wasn't conscious back then, but later . . . when SETI@home finally received that message back, oh, however many years ago, Aineko remembered the lobsters. And cracked it wide open while all the distributed CETI teams were still thinking in terms of Von Neumann architectures and concept-oriented programming: it's a semantic net designed to mesh perfectly with the lobster broadcast all those years ago, and provide a high-level interface to a communications network we're going to visit." She squeezes Boris's fingertips. "SETI@home logged these coordinates as the origin of the transmission, and Amber decided to come visiting. Hence, this expedition. Aineko created a virtual lobster and interrogated the ET packet, hence the communications channel we're about to open."

"Ah, is all a bit clearer," says Donna. "But the lawsuit—" she glances at the hollow wicker man in the corner.

"Well, here we have a problem," says Ang.

"No," says Pierre. "I have a problem. And it's all Amber's fault."

"Hmm?" Donna stares at him. "Why blame the queen?"

"Because she's the one who picked the lunar month to be the reporting time period for companies in her domain, and specified raith-law for resolving corporate conflicts," he grumbles.

"*Compurgation*, in this day and age! And she appointed me her champion." *In the most traditional way imaginable*, he remembers with a warm frisson of longing. He'd been hers in body and soul, before that disastrous experiment. He isn't sure whether it still applies, but—"I've got to take on this lawsuit on her behalf, in adversarial stance."

He glances over his shoulder: the wicker man sits there placidly, pouring beer down its invisible throat like a tired farm laborer.

"Trial by combat," Su Ang explains to Donna's perplexed ghost-swarm, which is crawling all over the new concept in a haze of confusion. "Not physical combat, but a conflict of interest. It seemed like a good idea at the time, to keep junk litigants out of the Ring Imperium; but the queen mother is *very* persistent. Probably because if she wins, she gets to own everything. And I mean *everything*."

Ten million kilometers out, Hyundai +4904/-56 looms beyond the parachute-shaped sail of the *Field Circus* like a rind of darkness bitten out of the edge of the universe. Heat from the gravitational contraction of its core keeps it warm, radiating at six hundred degrees absolute, but the paltry emission does nothing to break the eternal ice that grips Callidice, Iambe, Celeus, and Metaneira—stillborn planets locked in orbit around the brown dwarf. However, planets aren't the only structures that orbit the massive sphere of hydrogen. Close in, skimming the cloud-tops by only twenty thousand kilometers, Boris's phased-array eye has blinked at something metallic and hot. Whatever it is, it orbits out of the ecliptic plane traced by the icy moons, and in the wrong direction. Further out, a speckle of reflected emerald laser light picks out a gaudy gem against the starscape: their destination, the router.

"That's it," says Boris. His body shimmers into humanity, retconning the pocket universe of the bridge into agreeing that he's been present in primate form all along. Amber glances sideways: Sadeq is still wrapped in ivy, his skin the texture of weathered limestone. "Closest approach is sixty-three light seconds, due in eight hundred thousand; can give you closer contact if we maneuver, but will take time to achieve a stable orbit."

Amber nods thoughtfully, sending copies of herself out to work the mechanics. The big light-sail is unwieldy, but can take advantage of two power sources: the original laser beam from Jupiter, and its reflection bouncing off the now-distant primary light-sail. The temptation is to rely on the laser for constant acceleration, to just motor on in and squat on the router's cosmic doorstep, except for the risk of beam interruption. It's happened before, for seconds to minutes at a time, about six times on the voyage so far. She's not sure what causes it (Pierre has a theory about Oort Cloud objects occulting the beam) but the implications of losing power while maneuvering deep in a gravity well are much more serious than a transient loss of thrust in free interstellar flight. "Let's just keep it fail-safe," she says. "We'll go for a straight orbital insertion and steady cranking. I don't want us on a free-flight trajectory that entails lithobraking if we can't get the sail back."

"Very prudent," Boris agrees. "Marta, work on it." A buzzing presence of not-insects indicates that the heteromorphic helmswoman is on the job. "I think we should be able to take our first close-in look in about two million seconds, but if you want I can ping it now. . . ?"

"No need for protocol analysis," Amber says casually. "Where's—ah, there you are." She reaches down and picks up Aineko, who twists round sinuously and licks her arm with a tongue like sandpaper. "What do *you* think?"

"Do you want fries with that?" asks the cat, focusing on the artifact at the center of the main screen in front of the bridge.

"No, I just want a conversation," says Amber.

"Well, okay." The cat dims, moves jerkily, sucking up local processing power so fast that it disturbs the local physics model. "Opening port now."

A subjective minute or two passes. "Where's Pierre?" Amber asks herself quietly. Some of the maintenance metrics she can read from her privileged viewpoint are worrying: the *Field Circus* is running at almost eighty percent of utilization. Whatever processing Aineko is doing in order to establish the interface to the router, it's taking up an awful lot of capacity. "And where's the bloody lawyer?" she adds, almost as an afterthought.

The *Field Circus* is small, but its light sail is highly controllable. Aineko takes over a cluster of cells in its surface, turning them from straight reflectors into phase-conjugate mirrors; a small laser on the ship's hull begins to flicker thousands of times a second, and the beam bounces off the modified segment of mirror, focusing to a coherent point right in front of the distant blue dot of the router. Aineko ramps up the modulation frequency, adds a bundle of channels using different wavelengths, starts feeding out a complex set of pre-planned signals that provide an encoding format for high-level data.

"Leave the lawyer to me." She starts, glances sideways to see Sadeq watching her. He smiles without showing his teeth. "Lawyers do not mix with diplomacy," he explains.

"Huh." Ahead of them, the router is expanding. Strings of nacreous spheres curl in strange loops around a hidden core, expanding and turning inside-out in systolic pulses that spawn waves of recompilation through the structure. A loose red speckle of laser light stains one arm of beads: suddenly it flares up brilliantly, reflecting data back at the ship. "Ah!"

"Contact," purrs the cat. Amber's fingertips turn white where she grips the arms of her chair.

"What does it say?" she asks, quietly.

"What do *they* say," corrects Aineko. "It's a trade delegation and they're uploading right now. I can use that negotiation network they sent us to give them an interface to our systems if you want."

"Wait!" Amber half-stands in sudden nervousness. "Don't give them free access! What are you thinking of? Stick them in the throne room and we'll give them a formal audience in a couple of hours." She pauses. "That network layer they sent through. Can you make it accessible to us, use it to give us a translation layer into their grammar-mapping system?"

The cat looks round, thumps her tail irritably. "You'd do better loading the network yourself—"

"I don't want *anybody* on this ship running alien code before we've vetted it thoroughly!" she says urgently. "In fact, I want them bottled up in the Louvre grounds, just as thoroughly as we can, and I want them to come to us through our own linguistic bottleneck. Got that?"

"Clear," Aineko grumbles.

"A trade delegation," Amber thinks aloud. "What would Dad make of *that*?"

One moment, he's in the bar, shooting the bull with Su Ang and Donna the journalist's ghost and a copy of Boris; the next, he's abruptly precipitated into a very different space.

Pierre's heart seems to tumble within his rib cage, but he forces himself to stay calm as he glances around the dim, oak-paneled chamber. This is wrong, so wrong that it signifies either a major systems crash or the application of frightening privilege levels to his realm. The only person aboard who's entitled to those privileges is—

"Pierre?"

She's behind him. He turns, angry. "Why did you drag me in here? Don't you know it's rude to—"

"Pierre."

He stops. Looks at Amber. He can't stay angry at her for long, not to her face. She's not dumb enough to bat her eyelashes at him, but she's disarmingly cute for all that: yet something inside him feels shriveled and *wrong* in her presence. "What is it?" he says, curtly.

"I don't know why you've been avoiding me." She starts to take a step forward, then stops: bites her lip. *Don't do this to me!* he thinks. "You know it hurts?"

"Yes." That much of an admission hurts him, too. He can hear his father yelling over his shoulder, the time he found him with Laurent, elder brother: it's a choice between père or Amber, but it's not a choice he wants to make. *The shame.* "I didn't—I have some issues."

"It was the other night?"

He nods. *Now* she takes a step forward. "We can talk about it, if you want. Whatever you want," she says. And she leans toward him and he feels his resistance crumbling: he reaches out and hugs her and she wraps her arms around him and leans her chin on his shoulder, and this doesn't feel wrong: how can anything this good be wrong?

"It made me uncomfortable," he mumbles into her hair. "Need to sort out myself."

"Oh, Pierre." She strokes the down at the back of his neck. "You should have said. We don't have to do it that way. If you don't want to."

How to tell her how hard it is to admit that anything's wrong? Ever?

"You didn't drag me here to tell me that," he says, implicitly changing the subject.

Amber lets go of him, backs away almost warily. "What is it?" she asks.

"Something's wrong?" he half-asks, half-asserts. "Have we made contact yet?"

"Yeah," she says. Pulls a face. "There's an alien trade delegation in the Louvre. That's the problem."

"An alien trade delegation." He rolls the words around the inside of his mouth, tasting them. They feel paradoxical, cold, slow, after the hot words of passion he's been trying to avoid uttering. His fault for changing the subject.

"A trade delegation," says Amber. "I should have anticipated. I mean, we were going to go through the router ourselves, weren't we?"

He sighs. "We thought we were going to do that." A quick prod at the universe's controls determines that he has certain capabilities: he invokes an armchair, sprawls across it. "A network of point-to-point wormholes linking routers, self-replicating communication hubs, in orbit around most of the brown dwarfs of the galaxy. Right? That's what we expected. Limited bandwidth, not a lot of use to a mature superintelligence that has converted the free mass of its birth solar system

into computronium, but sufficient for conversations. Conversations carried out via a packet-switched network in real time, not limited by the speed of light but bound together by a common reference frame and the latency between network hops."

"That's about the size of it," she agrees from the carved-ruby throne beside him. "Except that there's a trade delegation waiting for us. In fact, they're coming aboard already."

Pierre's brow wrinkles. "Doesn't make sense," he says, finally. "Doesn't make sense at all."

Amber nods. "I carry a ghost of Dad around. He's really upset about it."

"Listen to your old man." Pierre's lips quirk humorlessly. "We were going to jump through the looking glass, but it seems someone has beaten us to the punch. Question is why?"

"I don't like it." Amber reaches out sideways and he catches her hand. "And then there's the lawsuit. We have to hold the trial sooner rather than later."

He lets go of her fingers. "I'd really be much happier if you hadn't named me as your champion."

"Hush." The scenery changes: her throne is gone, and instead she's sitting on the arm of his chair, almost on top of him. "Listen. I had a good reason."

"Reason?"

"You have choice of weapons. In fact, you have the choice of the field of compurgation. This isn't just 'hit 'em with a sword until they die' time." She grins, impishly. "The whole point of a legal system that mandates trial by combat for commercial lawsuits, as opposed to an adjudication system, is to work out who's a fitter servant of society and hence deserving of preferential treatment. It's crazy to apply the same legal model to resolving corporate disputes that we use for arguments among people, especially as most companies are now software abstractions of business models; the interests of society are better served by a system that encourages efficient trade activity than by one that encourages litigation. It cuts down on corporate bullshit while encouraging the toughest ones to survive, which is why I *was* going to set up the trial as a contest to achieve maximum competitive advantage in a xenocommerce scenario. Assuming they really are traders, I figure we have more to trade with them than some damn lawyer from the depths of Earth's light-cone."

Pierre blinks. "Um." Blinks again. "I thought you wanted me to sideload some kind of fencing kinematics program and *skewer* the guy."

"Knowing how well I know you, why did you ever think that?" She slides down the arm of his chair and lands on his lap: twists round to face him in point-blank close-up. "Shit, Pierre, I *know* you're not some kind of macho psychopath!"

"But your mother's lawyers—"



She shrugs dismissively. "They're *lawyers*. Used to dealing with precedents. Best way to fuck with their heads is to change the way the universe works." She leans against his chest. "You'll make mincemeat of them. Profit-to-earnings ratio through the roof, blood on the stock exchange floor." His hands meet around the small of her back. "My hero!"

The Tuileries are full of confused lobsters.

Aineko has warped this virtual realm, implanting a symbolic gateway in the carefully manicured gardens outside. The gateway is about two meters in diameter, a verdigris-coated orouborou loop of bronze that sits like an incongruous archway astride a gravel path in the grounds. Giant black lobsters—each the size of a small pony—shuffle out of the loop's baby-blue buffer field, antennae twitching; they wouldn't be able to exist in the real world, but the physics model here has been amended to permit them to breathe and move by special dispensation.

Amber sniffs derisively as she enters the great reception room of the Sully wing. "Can't trust that cat with anything," she mutters.

"It was your idea, wasn't it?" asks Su Ang, trying to duck past the zombie ladies-in-waiting who carry Amber's train. Soldiers line the passage to either side, forming rows of steel to let the queen pass unhindered.

"To let the cat have its way, yes," Amber is annoyed. "But I didn't mean to let it wreck the continuity! I won't have it!"

"I never saw the point of all this mediaevalism, myself," Ang observes. "It's not as if you can avoid the singularity by hiding in the past." Pierre, following the queen at a distance, shakes his head, knowing better than to pick a fight with Amber over her idea of stage scenery.

"It looks good," Amber says tightly, standing before her throne and waiting for the ladies-in-waiting to arrange themselves before her. She sits down carefully, her back straight as a ruler, voluminous skirts bellling up: her dress is an intricate piece of sculpture that uses the human body within as a support. "It impresses the yokels and looks convincing on narrowcast media. It provides a prefabricated sense of tradition. Hints at the political depths of fear and loathing intrinsic to my court's activities and tells people not to fuck with me. And it reminds us where we've come from, while not giving away anything about where we're going."

"But that doesn't make any difference to a bunch of alien *lobsters*," points out Su Ang. "They lack the reference points to understand it." She moves to stand behind the throne. Amber glances at Pierre, waves him over. Pierre looks around, seeking real people, not the vacant eigenfaces of the zombies that give this scenery added biological texture. There in the red gown, isn't that Donna the Journalist? And over there, too, with shorter hair and wearing male drag: she gets everywhere. That's Angus, sitting behind the bishop. And—he sighs. "*You* tell her," Ang implores him.

"I can't," he admits. "We're trying to establish communication, aren't we? But we don't want to give too much away about what we are, how we think. A historical distancing act will keep them

from learning too much about us: the phase space of technological cultures that could have descended from these roots is too wide to analyze easily. So we're leaving them with the lobster translators and not giving anything away. Try to stay in character as a fifteenth century duchess from Albì—it's a matter of national security."

"Humph." Ang frowns as a flunky hustles forward to place a folding chair behind her. She turns to face the expanse of red and gold carpet that stretches to the doorway as trumpets blat and the doors swing open to admit the deputation of lobsters.

The huge lobsters, black and spiny, look ominous. Their monochrome carapaces are at odds with the brightly colored garb of the human crowd: their antennae are large and sharp as swords. But for all that, they advance hesitantly, eye turrets swiveling from side to side as they take the scene in. Their tails drag ponderously on the carpet, but they have no trouble standing.

The first of the lobsters halts short of the throne and angles itself to train an eye on Amber. "Am inconsistent," it complains: "there is no liquid hydrogen monoxide here, and you-species am misrepresented by initial contact. Inconsistency, explain?"

"Welcome to the human physical space-traveling interface unit *Field Circus*," Amber replies calmly. "I am pleased to see your translator is working adequately. You are correct, there is no water here: the lobsters don't normally need it when they visit us. And we humans are not water-dwellers. May I ask who you are when you're not wearing borrowed lobster bodies?"

Confusion. The second lobster rears up and clatters its long, armored antennae together; soldiers to either side tighten their grips on their spears, but it drops back down again soon enough.

"We are the Wunch," announces the first lobster, speaking clearly. "This is a body compliant translation layer. Based on map received from yourspace, units forty thousand trillion light-kilometers ago?"

"*He means twenty years*," Pierre whispers on a private channel Amber has multicast for the other real humans in the audience chamber reality. "*They've confused space and time for measurement purposes. Does this tell us something?*"

"*Relatively little*," comments someone else—Chandra? A round of polite laughter greets the joke, and the tension in the room eases slightly.

"We are the Wunch," the lobster repeats. "We come to exchange interest. What have you got that we want?"

Faint frown-lines appear on Amber's forehead. Pierre can see her thinking very rapidly. "We consider it impolite to ask," she says quietly.

Clatter of claws on underlying stone floor. Chatter of clicking mandibles. "You accept our translation?" asks the leader.

"Are you referring to the transmission you sent us, uh, thirty thousand trillion light-kilometers behind?" asks Amber.

The lobster bobs up and down on its legs. "True. We send."

"We cannot integrate that network," Amber replies blandly, and Pierre forces himself to keep a straight face. (Not that the lobsters can read human body language yet, but they'll undoubtedly be recording everything that happens here for future analysis.) "They come from a radically different species. Our goal in coming here is to connect our species to the network. We wish to exchange advantageous information with many other species."

Concern, alarm, agitation. "You cannot do that! You are not *untranslatable entity signifier*."

Amber raises a hand. "You said *untranslatable entity signifier*. I did not understand that. Can you paraphrase?"

"We, like you, are not *untranslatable entity signifier*. The network is for *untranslatable entity signifier*. We are to the *untranslatable concept #1* as a single-celled organism is to ourselves. You and we cannot *untranslatable concept #2*. To attempt trade with *untranslatable entity signifier* is to invite death or transition to *untranslatable concept #1*."

Amber snaps her fingers: time freezes. She glances round at Su Ang, Pierre, the other members of her primary team. "Opinions, anyone?"

Aineko, hitherto invisible, sits up on the carpet at the foot of the dais: "I'm not sure. The reason those macros are tagged is that there's something wrong with their semantics."

"Wrong with—how?" asks Su Ang.

The cat grins, cavernously, and begins to fade. "Wait!" snaps Amber.

**Aineko continues her fade, but leaves a shimmering presence behind: not a grin, but a neural network weighting map, three dimensional and incomprehensibly complicated. "The *untranslatable entity concept #1* when mapped onto the Lobster's grammar network has elements of 'god' overloaded with attributes of mysticism and Zen-like incomprehensibility. But I'm pretty sure that what it *really* means is 'optimized conscious upload that runs much faster than realtime.' A type-one weakly superhuman entity, like, um, the folks back home. The implication is that this Wunch wants us to view them as gods." The cat fades back in. "Any takers?"**

"Small-town hustlers," mutters Amber. "Talking big—or using a dodgy metagrammar that makes them sound bigger than they are—to bilk the hayseeds new to the big city."

"Most likely." Aineko turns and begins to wash her flank.

"What are we going to do?" asks Su Ang.

"Do?" Amber raises a pencil-lined eyebrow, then flashes a grin that chops a decade off her apparent age. "We're going to have fun!" She snaps her fingers again and time unfreezes: there's no change in continuity except that Aineko is still present, at the foot of the throne. The cat looks up and gives the queen a dirty look. "We understand your concern," Amber says smoothly, "but we have already given you the physiology models and neural architecture of the bodies that you are wearing. We want to communicate: why won't you show us your real selves, or your real language?"

"This is trade language!" protests Lobster number one. "Wunch am/are metabolically variable coalition from number of worlds. No uniformity of interface. Easiest to conform to one plan and speak one tongue optimized for your comprehension."

"Hmm." Amber leans forward. "Let me see if I understand you. You are a coalition of individuals from a number of species. You prefer to use the common user interface model we sent you, and offered us the language module you're using for an exchange? And you want to trade with us."

"Exchange interest," the Wunch emphasizes, bouncing up and down on its legs. "Can offer much! Summaries of a thousand civilizations. Safe tunnels to a hundred archives on the net suitable for beings who are not *untranslatable entity signifier*. Able to control risks of communication. Have technique of manipulating matter at molecular level. Solution to algorithmic iterated systems based on quantum entanglement."

"*Old-fashioned nanotechnology and shiny beads to dazzle the primitives,*" Pierre mutters on Amber's multicast channel. "*How backward do they think we are?*"

"*The physics model in here is really over-done,*" comments Boris. "*They may even think this is real, that we're primitives coat-tailing it on the back of the Lobsters' efforts.*"

Amber forces a smile. "That is most interesting!" she trills at the Wunch's representatives. "I have appointed two representatives who will negotiate with you; this is an internal contest within my own court. I commend to you Pierre Naqet, my own commercial representative. In addition, you may want to deal with Alan Glashwicz, an independent factor who is not currently present. Others may come forward in due course if that is acceptable."

"It pleases us," says Lobster number one. "We are tired and disoriented by the long journey through gateways to this place. Request resumption of negotiations later?"

"By all means." Amber nods. A sergeant-at-arms, a mindless but impressive zimboe controlled by her spider's nest of personality threads, blows a sharp note on his trumpet; the first audience is at an end.

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Outside the light-cone of the *Field Circus*, on the other side of the event horizon that separates Amber's little kingdom in motion from the depths of empire time that grip the solar system's entangled quantum networks, a singular new reality is taking shape.

Welcome to the moment of maximum change.

About ten billion humans are alive in the solar system, each mind surrounded by an exocortex of distributed agents, threads of personality spun right out of their heads to run on the clouds of utility fog—infinately flexible computing resources as thin as aerogel—in which they live. The foggy depths are alive with high-bandwidth sparkles; most of Earth's biosphere has been wrapped in cotton wool and preserved for future examination. For every living human, a thousand million software agents carry information into the farthest corners of the consciousness address space.

The sun, for so long an unremarkable mildly variable G2 dwarf, has vanished within a gray cloud that englobes it except for a narrow belt around the plane of the ecliptic. Sunlight falls, unchanged, on the inner planets: all except Mercury, which is no longer present, having been dismantled completely and turned into solar-powered high-temperature nanocomputers. A much fiercer light falls on Venus, now surrounded by glittering ferns of carbon crystals that pump angular momentum into the barely spinning planet via huge superconducting loops wound around its equator: this planet, too, is due to be dismantled. Jupiter, Neptune, Uranus—all sprout rings as impressive as Saturn's: but the task of cannibalizing the gas giants will take many times longer than the small rocky bodies of the inner system.

The ten billion inhabitants of this radically changed star system remember being human; almost half of them pre-date the millennium. Some of them still *are* human, untouched by the drive of meta-evolution that has replaced blind Darwinian change with a goal-directed teleological progress; they cower in gated communities and hill forts, mumbling prayers and cursing the ungodly tamperers with the natural order of things. But eight out of every ten living humans are included in this phase-change: it's the most inclusive revolution in the human condition since the discovery of speech.

A million outbreaks of gray goop—runaway nanoreplicator excursions—threaten to raise the temperature of the biosphere dramatically: they're all contained by the planetary-scale immune system fashioned from what was once the World Health Organization. Weirder catastrophes threaten the boson factories in the Oort Cloud; antimatter factories hover over the solar poles. Sol system shows all the symptoms of a runaway intelligence excursion, exuberant blemishes as normal for a technological civilization as skin problems on a human adolescent.

The economic map of the planet has changed beyond recognition. Both capitalism and communism, bickering ideological children of a proto-industrial outlook, are as obsolete as the divine right of kings: companies are alive, and dead people may live again too. Globalism and tribalism have run to completion, diverging respectively into homogeneous interoperability and the schwartzchild radius of insularity. Beings that remember being human plan the deconstruction of Jupiter, the creation of a great simulation space that will expand the habitat available within the solar system; by converting all the planets into processors, they can accommodate as many human-equivalent minds as a galactic civilization—one with a planet hosting ten billion in orbit around every star in the galaxy.

A more mature version of Amber lives down in the surging chaos of near-Jupiter space: there's an instance of Pierre, too, although he has relocated light-hours away, near Neptune. Whether she

still sometimes thinks of her relativistic twin, nobody can tell. In a way, it doesn't matter: because by the time the *Field Circus* returns to Jupiter orbit, as much subjective time will have elapsed as will flash by in the real universe between this moment and the end of the era of star formation in this galaxy.

"As your theologian, I am telling you that they are not gods."

Amber nods patiently. Watches Sadeq closely.

Sadeq coughs grumpily. "Tell her, Boris."

Boris tilts his chair back and turns it toward the queen. "He is right, Amber. They are traders; not clever ones, either. Is hard to get handle on their semiotics while they hide behind the lobster model we uploaded in their direction twenty years ago, but are certainly not crusties, and are definite not human either. Or transhuman. My guess, they are bunch of dumb hicks who get hands on toys left behind by much smarter guys. Like the rejectionist factions back home. Imagine they are waking up one morning and find everyone else is gone to the great upload environment in the sky. They have the planet to themselves. What you think they do with whole world, with any gadgets they trip over? Some will smash everything they come across, but others not so stupid. But they think *small*. Scavengers, deconstructionists. Their whole economic outlook are negative-sum game. Go visit aliens to rip them off, take ideas, not expand selves and transcend."

Amber stands up, walks toward the windows at the front of the bridge. In black jeans and chunky sweater she barely resembles the feudal queen whose identity she takes on for visitors. "Taking them on board was a risk."

"How many angels can dance on the head of a pin?" Sadeq smiles crookedly. "We have an answer. But they may not even realize they are dancing with us. These are not the gods you were afraid of finding."

"No." Amber sighs. "Not too different from us, though. I mean, we aren't exactly well-adapted to this environment, are we? We tote these body-images along, rely on fake realities that we can map into our human-style senses. We're emulations, not native AI's. Where's Su Ang?"

"I can find her." Boris frowns.

"I asked her to analyze the aliens' arrival times," Amber adds as an after-thought. "They're close; too close. I think everything Aineko came up with is flawed. The *real* owners of this network we've plugged into probably use much higher-level protocols to communicate; sapient packets to build effective communications gateways. This Wunch, they probably lurk in wait for newbies to exploit. Pedophiles hiding outside the school gate: I don't want to give them that opportunity before we make contact with the real thing!"

"You may have little choice," says Sadeq. "If they are without insight, as you suspect, they may become afraid if you edit their environment. They may lash out. I doubt they even understand

how they created the contaminated metagrammar that they transmitted back to us. It will be to them just a tool that makes simple-minded aliens more gullible, easier to negotiate with. Who knows where they got it?"

"A grammatical weapon." Boris spins himself round slowly. "Build propaganda into your translation software if you want to establish a favorable trading relationship. How cute. Haven't these guys ever heard of Newspeak?"

"Probably not," Amber says slowly, pausing for a moment to spawn spectator threads to run down the book and all three movie versions of *1984*, followed by the sharecropped series of sequel novels. She shivers uncomfortably as she re-integrates them. "Ick. That's not a very nice vision. Reminds me of—" she snaps her finger, trying to remember Dad's favorite— "Dilbert."

"Friendly fascism," says Sadeq. "It matters not, whosoever is in charge. I could tell you tales from my parents, of growing up with a revolution. To never harbor self-doubt is poison for the soul: and these aliens want to inflict their certainties upon us."

"I think we ought to see how Pierre is doing," Amber says aloud. "I certainly don't want them poisoning him." She grins. "That's *my* job."

Donna the Journalist is everywhere simultaneously. It's a handy talent: makes for even-handed news coverage when you can interview both sides at the same time.

Right now one of her is in the bar with Alan Glashwicz, who evidently hasn't realized that he can modulate his ethanol dehydrogenase levels voluntarily and who is consequently well on the way to being steaming drunk. Donna is assisting the process: she finds it fascinating to watch this bitter young man who has lost his youth to a runaway self-enhancement process.

"I'm a full partner," he says bitterly, "in Glashwicz and Selves. I'm one of the Selves. We're all partners, but it's only Glashwicz Prime who has any clout. The old bastard: if I'd known I'd grow up to become *that*, I'd have run away to join some hippie antiglobalist commune instead." He drains his glass, demonstrating his oropharyngeal integrity, snaps his fingers for a refill. "I just woke up one morning to find I'd been resurrected by an older self. Said he valued my youthful energy and optimistic outlook, then offered me a minority stake with stock options that would take five years to vest. The bastard."

"Tell me about it," Donna coaxes sympathetically. "Here we are, stranded among idiopathic types, not among them a single multiplex—"

"Damn straight." Another bottle of Bud appears in Glashwicz's hands. "One moment I'm standing in this apartment in Paris facing total humiliation by a cross-dressing commie asshole called Macx and his slimy French manager bitch, and the next I'm on the carpet in front of my alter-ego's desk and he's offering me a job as junior partner. It's seventeen years later, all the weird nonsense that guy Macx was getting up to is standard business practice, and there's six of me in the outer office taking research notes because myself-as-senior-partner doesn't trust anyone else to work with him. It's humiliating, that's what it is."

"Which is why you're here." Donna waits while he takes a deep swig from the bottle.

"Yeah. Better than working for myself, I can tell you—it's not like being self-employed. You know how you sometimes get distant from your work? It's really bad when you see yourself from the outside with another half-gigasecond of experience and the new-you isn't just distant from the client base, he's distant from the you-you. So I went back to college and crammed up on artificial intelligence law and ethics, the jurisprudence of uploading, and recursive tort. Then I volunteered to come out here. He's still handling *her* account, and I figured—" Glashwicz shrugged.

"Did any of the delta-you's contest the arrangement?" asks Donna, spawning ghosts to focus in on him from all angles. For a moment she wonders if this is wise: if maybe her audience will try and get a handle on her true identity by watching how she observes. But she dismisses the thought—it's an overly subtle risk.

Glashwicz's face is a study in perspectives. "Oh, one did," he says dismissively; one of Donna's viewports captures the contemptuous twitch in his cheek. "I left her in my apartment freezer. Figured it'd be a while before anybody noticed. It's not murder—I'm still here, right?—and I'm not about to claim tort against myself. I think. It'd be a left-recursive lawsuit, anyway, if I did it to myself."

"The aliens," prompts Donna. "And the trial by combat. What's your take on that?"

Glashwicz grins lop-sidedly. "Little bitch-queen takes after her father, doesn't she? He's a bastard, too. The competitive selection filter she's imposed is evil—it'll cripple her society if she leaves it in place for too long, but in the short run, it's a major advantage. So she wants me to trade for my life and I don't get to lay my formal claim against her unless I can out-perform her pet day trader, that punk from Marseilles. Yes? What *he* doesn't know is, I've got an *edge*. Full disclosure." He lifts his bottle drunkenly. "Y'see, I know that *cat*. One that's gotta brown at-sign on its side, right? It used to belong to Queenie-darling's old man, Manfred, the bastard. You'll see. Her mom, Pamela, Manfred's ex, she's my client in this case. And she gave me the cat's ackle keys. *Access* control. Get a hold of its brains and grab that damn translation layer it stole from the CETI@home mob. *Then* I can talk to them straight."

The drunken future-shocked lawyer is on a roll. "I'll get their shit and I'll disassemble it. Disassembly is the future of industry, y'know?"

"Disassembly?" asks the reporter, watching him in disgusted fascination from behind her mask of objectivity.

"Hell, yeah. There's a singularity going on, that implies disequilibrium. An' wherever there's a disequilibrium, someone is going to get *rich* disassembling the left-overs. Listen, I once knew this econo-economist, that's what he was. Worked for the eurofeds, rubber fetishist. He tole me about this fact'ry near Barcelona. It had a disassembly line running in it. 'Spensive servers in boxes'd roll in at one end. Be unpacked. Then workers'd take the cases off, strip the disk drives, memory, processors, bits'n'guts out. Bag and tag job. Throw the box, what's left, 'cause it wasn't worth dick. Thing is, the manufact'rer charged so much for parts it was worth their while to buy



whole machines'n'strip them. To bits. And sell the *bits*. Hell, they got an enterprise award for ingenuity! All 'cause they knew that *disassembly* was the wave of the future."

"What happened to the factory?" asks Donna, unable to tear her eyes away.

Glashwicz waves an empty bottle at the starbow that stretches across the ceiling. "Ah, who gives a fuck? They closedown round about ten years 'go. Moore's Law topped out, killed the market. But disassembly—production-line cannibalism—itsa way to go. Take old assets an' bring new life to them. A fully 'preciated fortune." He grins, eyes unfocused with greed. "'S'what I'm gonna do to those space lobsters. Learn to talk their language an'll never know what hit 'em!"

The tiny starship drifts in high orbit above a turbid brown soup of atmosphere. Deep in the gravity well of Hyundai +4904/-56, it's a speck of dust trapped between two light sources: the brilliant sapphire stare of Amber's propulsion lasers in Jovian orbit, and the emerald insanity of the router itself, a hypertoroid spun from strange matter.

The bridge of the *Field Circus* is in constant use at this time, a meeting ground for minds with access to the restricted areas. Pierre is spending more and more time here, finding it a convenient place to focus his trading campaign and arbitrage macros. At the same time that Donna is picking the multiplexed lawyer's strategy apart, Pierre is present in neomorphic form—a quicksilver outline of humanity, six-armed and two-headed, scanning with inhuman speed through tensor maps of the information traffic density surrounding the router's clump of naked singularities.

There's a flicker in the emptiness at the rear of the bridge, then Su Ang has always been there. She watches Pierre in contemplative silence for a minute. "Do you have a moment?"

Pierre superimposes himself: one shadowy ghost keeps focused on the front panel, but another instance turns round, crosses his arms, waits for her to speak.

"I know you're busy—" she begins, then stops. "Is it *that* important?" she asks.

"It is." Pierre blurs, re-synchronizing his instances. "The router—there are four wormholes leading off from it, did you know that? Each of them is radiating at about 1011 kelvins, and every wavelength is carrying data connections, multiplexed, with a protocol stack that's at least eleven layers deep but maybe more—they show signs of self-similarity in the framing headers. You know how much data that is? It's about 1012 times as much as our high-bandwidth uplink from home. But compared to what's on the other side of the 'holes—" he shakes his head.

"It's big?"

"It's *unimaginably* big! These wormholes, they're a *low bandwidth* link compared to the minds they're hooking up to." He blurs in front of her, unable to stay still and unable to look away from the front panel. Excitement or agitation? Su Ang can't tell; with Pierre, sometimes the two states are indistinguishable. He gets emotional easily. "I think we have the outline of the answer to the Fermi paradox. Transcendents don't go traveling because they can't get enough *bandwidth*—trying to migrate through one of these wormholes would be like trying to download your mind

into a fruit fly, if they are what I think they are—and the slower-than-light route is out, too, because they couldn't take enough computronium along. Unless—"

He's off again. But before he can blur out, Su Ang steps across and lays hands on him. "Pierre. Calm down. Disengage. Empty yourself."

"I can't!" He really *is* agitated, she sees. "I've got to figure out the best trading strategy to get Amber off the hook with that lawsuit, then tell her to get us out of here; being this close to the router is seriously dangerous! The Wunch is the *least* of it!"

"Stop."

He pauses his multiplicity of presences, converges on a single identity focused on the here-and-now. "Yes?"

"That's better." She walks round him, slowly. "You've got to learn to deal with stress more appropriately."

"Stress!" Pierre snorts. He shrugs, an impressive gesture with three sets of shoulderblades. "That's something I can turn off whenever I need to. Side-effect of this existence; we're pigs in cyberspace, wallowing in fleshy simulations but unable to experience the new environment raw. What did you want from me, Ang? Honestly? I'm a busy man: I've got a trading network to set up."

"We've got a problem with the Wunch right now, even if you think something worse is out there," Ang says patiently. "Boris thinks they're parasites, negative-sum gamers who stalk newbies like us. Glashwicz is apparently talking about cutting a deal with them; Amber's suggestion is that you ignore them completely, cut them out and talk to anyone else who'll listen."

"Anyone else who'll listen: right," Pierre says heavily. "Any other gems of wisdom to pass on from the throne?"

Ang takes a deep breath. He's infuriating, she realizes. And worst of all, he doesn't notice it. Infuriating but cute. "You're setting up a trading network, right?" she asks.

"Yes. A standard network of independent companies, instantiated as cellular automata within the Ring Imperium switched legal service environment." He relaxes slightly. "Each one has access to a compartmentalized chunk of intellectual property and can call on the corrected parser we got from that cat. They're set up to communicate with a blackboard system—a souk—and I'm bringing up a link to the router, a multicast link that'll broadcast the souk's existence to anyone who's listening. Trade . . ." his eyebrows furrow. "There are at least two different currency standards in this network, used to buy quality-of-service precedence and bandwidth; they depreciate with distance, as if the whole concept of money was invented to promote the development of long-range network links. If I can get in first, when Glashwicz tries to cut in on the dealing by offering IP at discounted rates—"

"He's not going to, Pierre," she says as gently as possible. "Listen to what I said: Glashwicz is going to focus on the Wunch. He's going to offer them a deal. Amber wants you to *ignore* them. Got that?"

"Got it." There's a hollow *bong!* from one of the communication bells. "Hey, that's interesting."

"What is?" She stretches, neck extending snake-like so that she can see the window on underlying reality that's flickered into existence in the air before him.

"An ack from . . ." he pauses, then plucks a neatly reified concept from the screen in front of him and presents it to her in a silvery caul of light. "About two hundred light-years away! Someone wants to talk." He smiles. Then the front panel workstation *bongs* again. "Hey again. I wonder what that says."

It's the work of a moment to pipe the second message through the translator. Oddly, it doesn't translate at first; Pierre has to correct for some weird destructive interference in the fake lobster network before it'll spill its guts. "*That's* interesting," he says.

"I'll say." Ang lets her neck collapse back to normal. "I'd better go tell Amber."

"You do that," Pierre says worriedly. He makes eye contact with her, but what she's hoping to see in his face just isn't there; he's wearing his emotions entirely on the surface. "I'm not surprised their translator didn't want to pass that message along."

"Corrupted grammar," Ang murmurs, and bangs out in the direction of Amber's audience chamber. "*And* threats." The Wunch, it seems, have acquired a *very* bad reputation somewhere along the line—and Amber needs to know.

Glashwicz leans toward lobster number one, stomach churning. It's only a real-time kilosecond since his barroom interview, but in the intervening subjective time he's abolished a hangover, honed his brief, and decided to act. In the Tuileries. "You've been lied to," he confides quietly, trusting the privacy ackles that Amber's mother gave him—access lists that give him a degree of control over the regime within this virtual universe that the cat dragged in.

"Lied? Context rendered horizontal in past, or subjected to grammatical corruption? Linguistic evil?"

"The latter." Glashwicz enjoys this, even though it forces him to get rather closer to the two-meter-long virtual crustacean than he'd like. Showing a mark how they've been scammed is always good, especially when you hold the keys to the door of the cage they're locked inside. "They are not telling you the truth about this system."

"We received assurances," lobster number one says clearly. Its mouth-parts move ceaselessly—the noise comes from somewhere inside its head. "You do not share this phenotype. Why?"

"That information will cost you," says Glashwicz. "I am willing to provide it on credit."

They haggle briefly: an exchange rate in questions is agreed, as is a trust metric to grade the answers by. "Disclose all," insists the Wunch negotiator.

"There are multiple sentient species on the world we come from," says the lawyer. "The form you wear belongs to only one—one that wanted to get away from the form *I* wear. The original conscious tool-creating species. Some of the species today are artificial, but all of us trade information for self-advantage."

"This is good to know," the lobster assures him.

"What is your true form?" asks Glashwicz.

"Wait and I show you," says the lobster. It begins to shudder.

**"What are you doing—"**

"Wait." The lobster twitches, writhing slightly, like a portly businessman adjusting his underwear after a heavy business lunch. Disturbing shapes move, barely visible through the thick chitinous armor. "We want your help," the lobster explains, voice curiously muffled. "Want to establish direct trade links. Physical emissaries, yes?"

"Yes, that's very good," Glashwicz agrees excitedly: it's exactly what he's hoped for, the sought-after competitive advantage that will prove his fitness in Amber's designated trial by corporate combat. "You're going to deal with us directly without using that shell interface?"

"Agreed." The lobster trails off into muffled silence; little crunching noises trickle out of its shell. Then Glashwicz hears footsteps behind him on the gravel path.

"What are you doing here?" he demands, looking round. It's Pierre, back in standard human form—a sword hangs from his belt, and there's a big wheellock pistol in his hands. "Hey!"

"Step away from the alien, lawyer," Pierre warns, raising the gun.

Glashwicz glances back at lobster number one. It's pulled its front inside the protective shell and it's writhing now, rocking from side to side alarmingly. Something inside the shell is turning black, acquiring depth and texture. "I stand on counsel's privilege," Glashwicz insists: "speaking as this alien's attorney I must protest in the strongest terms—"

Without warning, the lobster lurches forward and rises up on its rear claws. It reaches out with huge claws, chellipeds coated with spiny hairs, and grabs Glashwicz by his arms. "Hey!"

Glashwicz tries to turn away, but the lobster is already looming over him, maxillipeds and maxillae reaching out from its head. There's a sickening crunch as one of his elbow joints crumbles, patella shattered by the closing jaws of a chelliped. He draws breath to scream, then the four small maxillae grip his head and draw it down toward the churning mandibles.

Pierre scurries sideways, trying to find a line of fire on the lobster that doesn't pass through the lawyer's body. The lobster isn't cooperating; it turns on the spot, clutching Glashwicz's spasming body to itself. There's a stench of shit, and blood is squirting from its mouthparts: something is very wrong with the biophysics model here, the realism turned all the way up to max.

"Merde," whispers Pierre: he fumbles with the bulky trigger, and there's a faint whirring sound. No explosion.

More wet crunching sounds follow as the lobster demolishes the lawyer's face and swallows convulsively, sucking his head and shoulders all the way into its gastric mill.

Pierre glances at the heavy handgun. "*Shit!*" he screams. He looks back at the lobster: then turns and runs for the nearest wall. There are other lobsters loose in the formal garden. "*Amber, emergency!*" he sends over their private channel. "*Hostiles in the Louvre!*"

The lobster that's taken Glashwicz hunkers down over the body and shudders. Pierre desperately winds the spring on his gun, too rattled to check that it's loaded. He glances back at the alien intruder. "*They've sprung the biophysics model,*" he sends. *I could die in here*, he realizes, momentarily shocked. *This instance of me could die forever.*

The lobster shell sitting in the pool of blood and human wreckage splits in two. A humanoid form begins to uncurl from within it, pale-skinned and glistening wet: vacant blue eyes flicker from side to side as it stretches and stands upright, wobbling uncertainty on its two unstable legs. Its mouth opens and a strange gobbling hiss comes forth.

Pierre recognizes her. "What are you doing here?" he yells.

The nude woman turns toward him. She's the spitting image of Amber's mother, except for the chellipeds she has in place of hands. She hisses: "*Equity!*" and takes a wobbly step toward him, pincers clacking.

Pierre winds the firing handle: there's a crash of gunpowder and smoke, a blow that nearly sprains his elbow, and the nude woman's chest erupts in a spray of blood. She snarls at him wordlessly and staggers—then ragged flaps of bloody meat close together, knitting shut with improbable speed. She resumes her advance.

"I *told* Amber that the Matrix would be more defensible," Pierre snarls, dropping the firearm and drawing his sword as the alien turns in his direction and raises arms that end in pincers. "*We need guns, dammit! Lots of guns!*"

"Waaant equity," hisses the alien intruder.

"You *can't* be Pamela Macx," says Pierre, his back to the wall, keeping the sword point before the lobster-woman-thing. "She's in a nunnery in Armenia. You pulled that out of Glashwicz's memories—he worked for her, didn't he?"

Claws go snicker-snack before his face. "Investment partnership!" screeches the harridan. "Seat on the board! Eat brains for breakfast!" It lurches sideways, trying to get past his guard.

"I don't fucking *believe* this," Pierre snarls. The Wunch-creature jumps at just the wrong moment and slides onto the point of his blade, claws clacking hungrily, but Pierre slides away, nearly leaving his skin on the rough bricks of the wall—and what's good for one is good for all, as the hacked model in force in this reality compels the attacker to groan and collapse.

Pierre pulls the sword out; then, nervously glancing over his shoulder, whacks at her neck. The impact jars his arm but he keeps hacking until there's blood spraying everywhere, blood on his shirt, blood on his sword, and a round thing sitting on a stump of savaged neck nearby, jaw working soundlessly in undeath.

He looks at it for a moment, then his stomach rebels and tries to empty itself into the mess. "*Where the hell is everybody?*" he broadcasts on the private channel. "*Hostiles in the Louvre!*"

He straightens up, gasping for breath. He feels *alive*, frightened and appalled and exhilarated simultaneously. The crackle of bursting shells on all sides drowns out the birdsong as the Wunch's emissaries adopt a variety of new and supposedly more lethal forms. "*They don't seem to be very clear on how to take over a simulation space,*" he adds. "*Maybe we already are untranslatable concept number #1.*"

"*Don't worry, I've cut off the incoming connection,*" sends Su Ang. "*This is just a bridgehead force; the invasion packets are bouncing.*"

Blank-eyed men and women in dusty black uniforms are hatching from the lobster shells, stumbling and running around the grounds of the royal palace like confused Huguenot invaders.

Boris winks into reality behind Pierre. "Which way?" he demands, pulling out an anachronistic but lethal katana.

"Over here. Let's work this together." Pierre jacks his emotional damper up to a dangerously high setting, suppressing natural aversion reflexes and temporarily turning himself into a sociopathic killer; he stalks toward an infant lobster-thing with big black eyes and a covering of white hair that mewls at him from a rose bed, and Boris looks away while he kills it. Then one of the larger ones makes the mistake of lunging at Boris and he chops at it reflexively.

Some of the Wunch try to fight back when Pierre and Boris try to kill them, but they're handicapped by their anatomy; a curious mixture of crustacean and human, claw and mandible against sword and dagger. When they bleed, the ground soaks with the cuprous hue of lobster juice.

"Let's fork," suggests Boris. "Get this over with." Pierre nods, dully—everything around him is wrapped in a layer of don't-care, except for a glowing dot of artificial hatred—and they fork, multiplying their state vectors to take full advantage of the virtualization facilities of this universe. There's no need for reinforcements; the Wunch focused on attacking the biophysics model of the

universe, making it mimic a physical reality as closely as possible, and paid no attention to learning the more intricate tactics that war in a virtual space demands.

Presently Pierre finds himself in the audience chamber, face and hands and clothing caked in hideous gore, leaning on the back of Amber's throne. There's only one of him now. One of Boris—the only one?—is standing near the doorway. He can barely remember what has happened, the horrors of parallel instances of mass-murder blocked from his long-term memory by a high-pass trauma filter. "Looks clear," he calls aloud. "What shall we do now?"

"Wait for Catherine di Medici to show up," says the cat, its grin materializing before him like a numinous threat. "Amber *always* finds a way to blame her mother. Or didn't you already know that?"

Pierre glances at the bloody mess on the footpath outside where the first lobster-woman attacked Glashwicz. "I already did for her, I think." He remembers the action in the third person, all subjectivity edited out. "The family resemblance was striking," the thread that still remembers her in working memory murmurs: "I just hope it's only skin-deep." Then he forgets the act of apparent murder forever. "Tell the queen I'm ready to talk."

Welcome to the down-slope on the far side of the curve of accelerating progress.

Back in the solar system, Earth orbits through a dusty tunnel in space: sunlight still reaches the birthworld, but much of the rest of the star's output has been trapped by the growing concentric shells of computronium built from the wreckage of the innermost planets.

Two billion or so mostly unmodified humans scramble in the wreckage of the phase transition, not understanding why the vast superculture they so resented has fallen quiet: little information leaks through their fundamentalist firewalls, but what there is shows a disquieting picture of a society where there are no *bodies* any more. Utility foglets blown on the wind form aerogel towers larger than cyclones, remove the last traces of physical human civilization from most of Europe and the North American coastlines; enclaves huddle behind their walls and wonder at the monsters and portents roaming the desert of post-industrial civilization, mistaking acceleration for collapse.

The hazy shells of computronium that ring the sun—concentric clouds of orbiting nanocomputers, powered by sunlight, like the packed layers of a matrioshka doll—are still immature, holding barely a thousandth of the physical planetary mass of the system, but they already support a classical computational density of 1042 MIPS; enough to support a billion civilizations as complex as the one that existed immediately before the great disassembly. The conversion hasn't yet reached the surfaces of the gas giants, and some scant outer-system enclaves remain independent—Amber's Ring Imperium still exists as a separate entity, and will do so for some years to come—but the inner solar system planets, with the exception of Earth, have been colonized more thoroughly than any dusty NASA proposal from the dawn of the space age could have envisaged.

From outside the Accelerated civilization, it isn't really possible to know what's going on *inside*. The problem is bandwidth: while it's possible to send data in and get data out, the sheer amount

of computation going on in the virtual spaces of the Acceleration dwarfs any external observer. Inside that swarm, minds a trillion or more times as complex as humanity think thoughts as far beyond human imagination as a microprocessor is beyond a nematode worm. A million random human civilizations flourish in worldsapes tucked in the corner of this world-mind; death is abolished, life is triumphant. A thousand ideologies flower, human nature adapted where necessary to make this possible. Ecologies of thought are forming in a Cambrian explosion of ideas: for the solar system is finally rising to consciousness, and mind is no longer restricted to the mere kilotons of gray fatty meat harbored in fragile human skulls.

Somewhere in the Acceleration, colorless green ideas adrift in furious sleep remember a tiny starship launched years ago, and pay attention. Soon, they realize, the starship will be in position to act as their proxy in an ages-long conversation. Negotiations for access to Amber's extrasolar asset commence; the Ring Imperium prospers.

But first, the operating software on the human side of the network link will require an upgrade.

The audience chamber in the *Field Circus* is crammed: everybody aboard the ship—except the still-frozen lawyer and the alien barbarian intruders—is present.

"I'm not saying you have to follow me," says Amber, addressing her court. "Just, that it's what we came here for. We've established that there's enough bandwidth to transmit people and their necessary support VM's; we've got some basic expectancy of goodwill at the other end, or at least an agalmic willingness to gift us with advice about the untrustworthiness of the Wunch. I propose to copy myself through and see what's at the other side of the wormhole; what's more, I'm going to suspend myself on this side and hand over to whichever instance of me comes back, unless there's a long hiatus. How long, I haven't decided yet. Are you guys happy to join me?"

Pierre stands behind her throne, hands on the back: looking down over her head, at the cat in her lap, he's sure he sees it narrow its eyes at him. *Funny*, he thinks: *we're talking about jumping down a rabbit hole and trusting whoever lives at the other end with our personalities. After seeing the Wunch. Does this make sense?*

"Forgive, please, but am not stupid," says Boris. "This is Fermi-paradox territory, no? Instantaneous network exists, is traversable, with bandwidth adequate for human-equivalent minds. Where are alien visitors, in history? Must be overriding *reason* for absence. Think will wait here and see what comes back. *Then* make up mind to drink the poison Kool-Aid."

"I've got half a mind to transmit myself through without backup," says someone else—Angus—"but that's okay: half a mind is all we've got the bandwidth for." Half-hearted laughter shores up his wisecrack, supports a flagging determination to press through.

"I'm—with Boris," says Su Ang. She glances at Pierre, catches his eye: suddenly a number of things become clear to him, crystal-clear. He shakes his head minutely. *You never had a chance: I belong to Amber*, he thinks, but deletes the thought before he can send it to her. Maybe in another instantiation his issues with the queen's *droit du seigneur* would have bulked up larger, splintered his determination; maybe in another world, it has already happened? "I think this is very rash," she says in a hurry. "We don't know enough about post-singularity civilizations."



"It's not a singularity," Amber says waspishly. "It's just a brief burst of acceleration. Like cosmological expansion."

"Smooths out inhomogeneities in the initial structure of consciousness," purrs the cat. "Don't I get a vote?"

"You do," Amber sighs. She glances round. "Pierre?"

Heart in his mouth: "I'm with you."

She smiles, brilliantly. "Well, then. Will the nay-sayers please leave the universe?"

Suddenly, the audience chamber is half-empty.

"I'm setting a watchdog timer for a billion seconds into the future, to re-start us from this point if the router doesn't send anyone back in the intervening time," she announces gravely, taking in the serious-faced avatars of those who remain. Surprised: "Sadeq! I didn't think this was your type of—"

He doesn't smile. "Would I be true to my faith if I wasn't prepared to bring the words of Mohammed, peace be unto him, to those who may never have heard his name?"

Amber nods. "I guess."

"Do it," Pierre says urgently. "You can't keep putting it off forever."

Aineko raises her head. "Spoilsport!"

"Okay." Amber nods. "Let's *do*—"

She punches an imaginary switch, and time stops.

At the far end of a wormhole, two hundred light years distant in real space, coherent photons begin to dance a story of human identity before the sensoria of those who watch. And all is at peace in orbit around Hyundai +4904/-56 . . . for a while. . .