



TOR  ESSENTIALS

up against it

with a new introduction by
James S. A. Corey
author of the bestselling
Expanse novels

**laura j.
mixon**

writing as M. J. Locke

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UP AGAINST IT, Book 1 of WAVE, a science fiction trilogy, by Laura J. Mixon

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UP AGAINST IT

Laura J. Mixon



A TOM DOHERTY ASSOCIATES BOOK
NEW YORK

FOR LENELLE CITTADIN

LAURA J MIXON

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There isn't room for eccentricity in an asteroid community. When you are not working your freezing, grimy ass off out on a mining stroid—or in the refinery—or snatching a bite of vat-grown chow or a few hours' sleep (or if you are lucky, some sweaty, low-gee booty), you are crawling around the habitat machinery, scraping knees and knuckles, replacing broken parts and plugging leaks. Because that is what keeps you alive.

Everyone thought things would change when they brought the bugs Up, a few decades back. But they are not the magic medicine everyone thought they would be.

Make no mistake; without them, the population beyond lunar orbit would be a tiny fraction of what it is today. Bugs build and maintain the primary structures, create food and clean air and water from the raw materials we provide.

But they can't do everything, nor be everywhere. Fact is, they are sensitive to temperature and pressure changes, they eat a lot of fuel, and they are *ass* to program properly. Keeping them primed and ready to do what you need takes a small army.

The short version? You want to live, Upside; you work very hard, all the time, and you play by the rules. Don't waste time, don't waste resources, and *especially* don't mess with the bugs.

—From *Downsider Upside*, Lesley Marcus Vaughn
(New York, 2389)

1

So here they all were, Geoff and his three best buddies, early one Tuesday morning, in the spinning habitat city of Zekeston that lay buried a kilometer below asteroid 25 Phocaea's rocky surface: about to mess with the bugs.

Geoff and Amaya stood in the shadows near the university plaza. Kamal crouched behind a low wall on the mezzanine overhead. Kam's job was to call the op and film it. Ian sat blogging about rocketbikes at a nearby coffee kiosk on the edge of the plaza, eating a pastry and keeping an eye out for any city or university cops that might show up.

Geoff checked his heads-up. The timing had to be just right. A few seconds off in one direction and eight months' effort would be wasted. A few seconds off in the other and they would all go to jail. His heart was pounding harder than it ever did when he was out in the Big Empty, racing his rocketbike.

His fear wasn't of getting caught. No; what scared him was that in two minutes the whole solar system would know whether it would all pay off. All those hours of isolation; the sneaking around behind their parents' and teachers' backs; the endless succession of foul smells, burns, and stains that had ruined their clothing and scarred their hands—the risks he'd pressured his buddies to take, to help him do this—if this didn't work, he'd look like a fool.

Nearby, a handful of drowsy, puffy-eyed university students slumped on plaza benches. Class scrolls lay inert, half-furled in their laps, blinking unnoted. Pastries and bulbs of coffee or tea cooled beside them on the benches. The air was chilly and still, as always. Birds and ground squirrels—refugees from Kukuyoshi, the habitat's arboretum—snatched crumbs at their feet.

The fountain that dominated the plaza's center was called El Dorado. It was a tumble of rhombic, trapezoidal, and rectangular gold and platinum blocks jutting up at various angles in a metallic bloom. As usual, the fountain was turned off, though the toroidal pool at its base contained brackish liquid with bits of debris floating in it. The sour smell of spent assembly fluid wafted across to Geoff and Amaya in their hiding place. It seemed really noticeable to him, but no one in the plaza seemed bothered by it.

Kam radioed them. "A minute-fifteen before the cameras go live. We need to move now. Amaya, Geoff—you set?"

He and Amaya exchanged a glance, nodded to each other. "Set."

Kam's voice whispered the countdown. "Ten seconds ... five ... two, one. Amaya, go!"

Amaya strode into the plaza, not glancing up at Kam's shadowed spot, nor over at Ian. Kam said in his ear, "... two, one. Geoff, go!"

Geoff crossed the plaza, about six paces behind Amaya and to the left. He might as well have been invisible. Amaya had dressed up in Downsider chic: bustier, translucent beaded overshirt, short-shorts, lace-up sandals; makeup, hair, neon animated tattoos that ran the length of her exposed flesh; the works.

She transected the plaza, headed away from the fountain, pulling the college students' gazes along in her wake. Geoff reached the fountain. He tossed the packet of triggering proteins he held into the dirty water. Then he headed for the

coffee shop. No one seemed to notice; everyone's gaze was on Amaya as she strode breezily away.

Geoff sat down next to Ian at a small table near the plaza. His heart beat so hard it hurt. He tried to catch his breath and as nonchalantly as he could, turned to look.

Some guy had fallen in step with Amaya, trying to chat her up. "Shit!" Geoff started upright, but Ian grabbed his wrist. "Relax. We're chill."

Geoff forced himself back down. Ian was right: Amaya shed the college student—smiling with a shrug, turning to walk backward as she made a reply, then spinning again to continue at a swift, casual pace—without even breaking stride. She exited the plaza.

Geoff checked his waveface again. The blackout had just ended—the "Stroider"-cams were now live. It was close. He couldn't tell whether she had been on-scene or not when the cameras came on.

"Stroiders" was a reality-broadcast back to Earth. Up to two billion Downsiders tuned in to see what the good people of Zekeston were up to at any given moment. The "Stroider"-cams made it hard to be sneaky. But there were always ways to get around the cams. You just had to put your mind to it.

Sneaky? They had been downright paranoid.

Geoff had done the bug programming. That was how it had all started. In Honors Programmable Matter last semester—the only class he'd ever done truly well in; the only one he cared about—he learned that assemblers were made from complex silica-based molecules. You manipulated assemblers by washing them with certain chemicals in set sequences. In response, they gathered all the right molecules trapped in their suspension fluid—a silicone-ethanol colloid with metal salts and other stuff—to build what you wanted. The resulting tiny machines burned alcohol and excreted tiny glass pellets that under the right conditions clumped together and made what everybody called bug grapes. Geoff had always wondered what those lumps were at the seams and joints of the utility piping. Yep, they were bug turds. Spent bug juice contained lots of these glass pellets, which ranged in size from marbles to grains of rice. Which was why bug juice spills sparkled under the lights so beautifully.

He had always wondered about that, ever since he was a little kid. Who would have thought spewage could be beautiful?

So yeah, it had been the glass turds that had given him the idea. Assemblers shit glass turds! How cool was that? It was a shame to let them go to waste. But to pull this off, they needed real bug juice. Since the good stuff was closely monitored, they would have to steal used juice, and see if they could distill it down and make it usable for their purposes.

Amaya had figured out how to tap the assembler discharge lines. They ran inside the maintenance tunnels that fed down the spokeway utility lines into the Hub. She had enlisted the help of her boyfriend, Ian, and they had spent two months collecting, distilling, and priming depleted bug juice until it was at sufficient strength to handle Geoff's programming. The resulting juice was feeble, but Geoff had figured how to make it work. (In a lab. If he had gotten all of the glitches out of the protein code. If, if, if.)

While all this was going on, Kam had been making a detailed study of all the mounted cams, rovers, and motes in the university plaza. He calculated camera angles, paths, and ranges of view, based on their technical specifications, and created a surveillance shadow map. His efforts had been aided by a field trip their class had made up to the surface of 25 Phocaea to visit the "Stroiders" broadcast studios.

Two half-hour "Stroiders" blackouts occurred every day, to give Zekies small islands of privacy in their lives. One occurred at two a.m. and the other cycled between three a.m. one day and one a.m. the next. The rest of the time, Zekeston's citizens were under scrutiny by billions of people they would never meet. Mostly, it was just an annoyance that everyone put up with that resulted in a stipend in everyone's bank account every month. It was only when you were trying to be sneaky that it mattered when and where the "Stroiders" shadows were.

The main way "Stroiders" got their Zekeston data feed was from the stationary cams and the rovers, but when something important happened, "Stroiders" motes typically showed up, a hazy glamour emitted from jets in the assembler dispersal piping. You couldn't hide from motes. So next Kam did a

science fair project: mote density versus “Stroiders” audiovisual resolution.

He sampled motes around the city and compared them to what people saw, Downside. (Phocaeans could not experience “Stroiders” the way Downsiders back on Earth did—as a fully realized, 3D virtual world—but they could sample it in video in small snatches, by submitting a request to the library and waiting a month.) The lowest mote concentrations in the university plaza typically occurred between four-thirty and eight a.m. on Tuesdays. This pinned down the time and place for the event. (He also got an A+ on the project, and second place in the senior-level information systems category.)

It was sheer serendipity that the best time to stage the event turned out to be the morning after high school graduation. The project became their secret graduation present to one another.

Over the past week and a half, they’d been spiking the fountain with bug juice. They had agonized over how to get the bug juice into the fountain without alerting everyone—“Stroider”-cams might black out periodically, but the plaza’s security cameras didn’t. And there were security guards and scary sorts prowling the nearby Badlands. Geoff and the others had no way of knowing when the plaza was being watched. So during one of the nighttime blackout periods, Ian had climbed down into the maintenance tunnels from an out-of-the-way entry port, made his way to beneath the plaza, inserted tubing into the water line for the fountain, and piped the juice in. If the university students or staff had noticed that the fountain was leaking, no one said anything about the leak, nor about any strange smells emanating from the pool. When the dribble stopped, Ian went back into the maintenance tunnel and removed the tap.

Geoff’s final task was the riskiest. They had a plan to avoid the camera, but there would be people in the plaza even at that hour. So Amaya had agreed to be a distraction. She wasn’t into the whole clothes, tattoos, and makeup thing, and Geoff was dubious about whether it was a good idea. But when she had shown up in Downsider drag this morning, Geoff and the others had barely recognized her. (“Say one word,” she’d warned them fiercely, “and I will pound you.”)

Geoff’s biggest worry was that her path was longer than his, and she might not exit the plaza before the “Stroider”-cams went live. The cops would be all

over those “Stroider” broadcasts to see who might have done it, and Geoff didn’t want their attention directed to Amaya. If anyone would take the heat for this, it should be him.

Geoff radioed Kam. “Well?”

Kam checked his own wavespace display. “Yep. Just.” They were careful not to say too much, in case their broadcasts were being monitored. She wouldn’t show up on the monitors. She’d gotten out clean. Geoff let out the breath he’d been holding, and drew another one in. He leaned on the table, trying to see what was going on without obviously staring at the fountain. Instead, he and Ian linked wavefaces and pretended to look at pictures of rocketbikes.

Beside him, Ian tensed. Geoff shifted in his chair and looked at the fountain, trying to act casual. He couldn’t believe anyone watching was going to buy their performance. Then he stopped caring.

Something was moving in the water. First a bubble, then two. He held his breath. Soon the water was boiling and seething like a live thing. The students sitting near the fountain began to notice. They scrambled back, scattering coffee bulbs. Flocks of panicked birds rose from their perches on the fountain blocks as dark shapes began to emerge from the surface of the water. A hand bone here. A foot bone there. Part of a skull. Teeth in a jawbone. A spine and pelvis.

The shapes began assembling themselves into skeletons. Most had a hunched, gnomish look. One or two were deformed, with feet where their hands should be, or heads growing out of their butts. Geoff frowned. That glitch again. He thought he had fixed it.

Soon whole skeletons were lurching up and collapsing back into the brew. The glitch seemed to have fixed itself. Good. Soon there were a dozen. Twenty at least!

For a minute Geoff thought that would be all they’d do, and that was dramatic enough. But then they began climbing out onto the tiles of the plaza. They joined bony hands and began to dance. The skeletons made a line and curved through the plaza. Students stepped back and watched as they skipped and capered and leapt, banged on their arms, rib cages, and thighbones, waved

their bony arms. They didn't sing—they couldn't; Geoff didn't even know where to start, to program larynxes and lungs—but they sure could shake their bones.

They didn't last long. They were made of spent juice and glass beads, after all, spun together by weak silica tendrils. The first shattered as its dancing and banging and clattering brought it in contact with a corner wall. Soon another burst. Even their own hands or elbows or knees were enough to cause them to fall to pieces. One burst in front of Geoff and Ian, who leapt back, knocking over their chairs—startled despite themselves. The air filled with clear, tan, and silvery beads and spidery strands of silicone.

In moments the skeletons had all burst. It was over. The plaza tiles were coated in tiny beads.

Geoff realized how many people had gathered. Someone started clapping and laughing. Others joined in—but he could see irritation on some faces, and hear grumblings, and that had its own rewards. People began to disperse, carefully stepping among the beads. One young man slipped and fell. “Stroiders” camera motes had come, too, just as Geoff had hoped, and now swirled in the air currents like fairy dust, smelling of ozone and faint, bitter mint.

Ian pressed his hands over his mouth. “Cool...” Geoff looked over and grinned. “*Domo*, doof.”

“Come on. Time to spin the sugar.” Ian grabbed his sleeve and dragged him into the plaza. They dashed down the lane to meet Kam and Amaya, slipping and sliding on bug grapes.

Geoff desperately wanted to go home and watch the news. But not today. Today was the big ice shipment, and nothing—not even Geoff's bug-turd art obsession—could be allowed to interfere with the ice harvest.

* * *

They got separated at the spokeway elevators. Amaya squeezed into a waiting elevator, and then Ian, who was holding her hand, but Geoff and Kamal stood one layer too far back in the crowd when the warning lights went off.

“You'll miss the harvest!” Ian said.

“We’ll take the stairs!” Geoff shouted, as the doors closed. He and Kam headed off at a run. “Meet you in the Hub!”

* * *

Zekeston was a fat, spinning habitat wheel buried below the surface of the asteroid. The city’s spin generated a gravity gradient, which ranged from barely a thousandth of a gee in the Hub to about three-quarters of Earth’s gravity at the outermost level. The university was on that highest-gee bottom level. That meant that the first fifty levels of Geoff and Kam’s travel to the Hub were a brutal climb up the dual stairway that wound around the inner walls of Eenie Spoke. Geoff dodged around other climbers with an “On your left!” here and an “Excuse me!” there. Kam came right behind. They were gasping for air before they were a third of the way up, despite the light tailwind wafting up from the lower levels, which dried their sweat and boosted them up toward the Hub.

Zekeston used to be called Ezekiel’s Town, but it wasn’t just *one* wheel within a wheel. It had twelve spokes that connected twenty-five nested wheels, stacked one inside the next, to the Hub. Each wheel held ten stories, for a total of two hundred fifty levels. Upspoke, where gravitation approached Earth’s, surfaces were flat—walkable and/or rollable. The lower-gee levels near the Hub were honeycombed tubes separating webbed open spaces. As the boys gained altitude the climb got easier, and by the time they’d reached Level 150, they began to make better time. At Level 80, the low-gee ropeworks appeared and they lofted themselves up into it. Thereafter they made swift progress. Finally, they launched themselves out into the microgee Hub.

The Hub was a sphere nearly a quarter kilometer in diameter. The entries to the twelve spokeways ran around the Hub’s girth: a ring of big holes, each with its own lift shaft, a dual spiral staircase and ropeworks visible inside. The Hub also housed YuanBioPharma’s main research facility and manufacturing plant; the main city hospital, Yamashiro Memorial; and the city assemblyworks.

Ian and Amaya stood in the queue for the big lifts up to Phocaea’s surface. They faced away from each other. Amaya had her arms crossed, and Ian’s jaw jutted out. Geoff exchanged a look with Kam as they crossed the Hub’s

ropeworks toward their friends.

Geoff groaned. “Another fight.”

Kam rolled his eyes. “Why don’t they break up and have done with it?”

Geoff said, “I don’t want to listen to them bickering. Why don’t you offer to partner with Ian this time, and I’ll go with Amaya?”

“Why do I have to go with Ian and you get to go with Amaya?”

“I took Ian last time.”

“Did not!”

“Did too!”

Kam held up his fist—rock-paper-scissors. Geoff sighed. “Oh, all right.” He chose scissors and Kam chose paper.

Kam dropped his fist. “Bastard.” Geoff just grinned.

After a few minutes, Geoff began to doubt that he had the better end of the deal. Amaya remained furious all the way up in the lift. When they reached the asteroid’s surface, she catapulted out of the lift so fast Geoff couldn’t keep up. He found her at their bikes in the hangar. She had changed out of the Downsider outfit, but she still had the makeup on, and he got glimpses of her tattoo, as it ran out onto her hands and up onto her neck.

“You want to talk?” he asked.

She threw her diagnostic tools into her kit. “/was the one who came up with the plan for getting the juice. I was the one who figured out how to get it primed. I’m a better mechanic than Ian is. And I can kick *your* ass in a race.” She glared at him. Geoff opened his mouth to argue. But maybe now wasn’t the time. “And all he gives a flying fuck about,” she said, “is how I look in a beaded bra.”

Geoff refrained from telling her that she really had looked amazing, and merely nodded.

“It’s all about how big your tits are, whether you had your tits modded, whether you put out,” she said. “That’s all anybody cares about. I could be Einstein, for fuck’s sake.” She glared at Geoff, daring him to argue. “I’m not saying I’m Einstein. It’s just that nobody would care if I was! The only thing that

matters is how tight a slab of ass I am.”

“Oh, come on. Nobody thinks that.” A storm gathered in her gaze. He lifted his hands. “That’s not what I meant. What I mean is, we couldn’t have pulled the op without you. You had great ideas. You are the best mechanic we’ve got.”

She gave him an appreciative look, mollified. Then she tossed her tools into her kit and mounted her bike, waiting for him to finish his own checks.

As he tightened his fuel lines one last time, he added, “But ... not to chafe you or anything ... but wasn’t that the whole point? You were *supposed* to get that kind of reaction.” He swung up onto his rocketbike and started the engine.

She leaned her chin on her forearms, braced against the handlebars. “But that’s the whole point! I get way more attention dressing like a sex sapient than I do for anything I do that actually *means* anything. It pisses me off. And then Ian...” she sighed. “He doesn’t get it. I told him what I’m telling you now, and he says he wants me to dress like that *all* the time. Butt floss, pushup bra, and all. Like all I am is girl-meat.” She sighed again. “I wish he cared about more than how big my boobs are and whether he’ll ever get the booty prize.”

Geoff nodded with a rueful sigh. Ian’s brains *did* go out his ears sometimes. Especially when his *chinfo* was involved. Geoff gave it fifty-fifty odds that Amaya would get tired of waiting before he figured her out.

2

Geoff stepped out onto the commuter pad with his bike. One 25 Phocaea day lasted about ten hours, and the sun was below the horizon right now. (Not that anybody cared; Phocaeans used a twenty-four-hour day, like most stroiders.) But the lights blazing on the disassembler warehouses made it hard for his eyes to dark-adapt. He tweaked his light filter settings—if you wanted a good harvest, you needed your night vision—and fumbled his way toward Amaya and the others, who were pushing their bikes toward the launch ramps. Then his big brother, Carl, radioed him and waved. Geoff sent his buddies on, left his bike on the pad, and bounded over to Carl.

By the time he got there, he could see well enough to note that Carl wore a pony bottle and one of the cheap, bulky, standard-issue suits they provided at the disassembler and storage warehouses. Which meant he'd sneaked out to watch the delivery. Geoff was surprised. This was about the only misdemeanor Geoff had ever known him to commit.

“Hey. What are you doing off work?”

“Hey! You nearly missed it.” Carl gestured into the inky sky, at the vast ice mountain that loomed overhead.

“I was busy.”

Carl eyed him suspiciously, but Geoff knew his brother couldn't see his expression very well through their visors, and didn't elaborate. Carl hadn't heard

about the bug-turd skeletons yet. But he would, and would freak if he learned Geoff had been responsible.

“Hurry!” Carl said, and set off. Geoff bounded after him, to the rim of the crater—leaping high in the low gravity, for the sheer joy of it—over to where the last of 25 Phocaea’s remaining ice stores were.

It made Geoff’s neck hairs bristle, how much ice filled the sky. The ice was a deep blue green, with swirls of ruddy umber and streaks and lumps of dirt. Mostly methane. A rich take. Water ice was good—necessary, in fact, to replenish their air and water stores and provide raw hydrogen for the fusion plant—but methane ice was much more important. Kuiper objects always had plenty of water, and methane was needed for the bugs that made the air they breathed, the food they ate, the hydrogen feed for their power plant, and everything else.

The tugs’ rockets flamed at the ice mountain’s edges, slowing its approach, but it was still moving fast enough that he could not believe they would get it stopped in time to keep from knocking this asteroid right out of orbit. It didn’t take a lot of mass to shove 25 Phocaea around—it was only seventy-five kilometers across.

The mountain grew and grew, and grew—till the brothers scrambled back reflexively. But as always, by the time the pilots blew the nets off, the ice mountain was moving no faster than a snail crawl. The ice touched down right in the crater’s center. The cheers of his buddies and the other rocketbikers rang in Geoff’s headset as the inverted crags of the mountain’s belly touched the crater floor. The ground began to tremble and buck and the brothers flailed their arms, trying not to lose their balance.

Geoff whooped. “We’ll make a fortune! Best ice harvest ever!”

There was a rule: what came back down belonged to the cluster. What made it into orbit around the asteroid was yours—if you could catch it.

“I knew you were going to say that,” Carl said. “You always say that.”

“That’s because it’s always true. Anyway, I’ve got to go. Don’t want to spin wry and miss the first wave of ejecta.”

“I’ll never get why you’re so into ice slinging.”

“It beats trash slinging!”

“Hey,” Carl broadcast, as Geoff bounded back toward his waiting rocketbike, “this job is just to pay tuition. Someday I’ll be a ship captain. You need to take the long view.”

“Burn hot,” Geoff retorted. *Burn hot*—crank up the fuel-oxide mix, because you might not be around tomorrow to enjoy whatever pleasure you’ve been putting off. Carl had always taken the long view and laid his plans carefully. Geoff had no patience for that. His bug-turd skeleton project was as long term as he was willing to go. He leapt onto his bike and raced to the far side of the crater.

Amaya, Kam, and Ian were already space-borne. He signaled to Amaya and she gave him her trajectory. Then he watched the spectacle of the ice mountain’s collapse into the crater, while waiting his turn at the base of the ramp.

Down it kept coming, all that ice, onto the remains of their prior shipment. It tumbled out over the crater bed in an avalanche, collapsing on itself, flinging ice shrapnel. Geoff, waiting in line with the other bikers, gripped his handlebars, raced his engine, impatient. Some of the ejecta were beginning to rain back down; more was propelled into orbit.

His turn—finally! He raced up the ramp, dodging flying ice shards, as the ice mountain finished settling. He whooped again as he reached orbital velocity. The ramp arced upward and then fell away—he was space-borne. He fired his rockets and caught up with Amaya. They spread their nets and got started harvesting ice.

* * *

Carl headed back to his shift work once the mountain had finished settling. On the way back to the warehouses, he thought about Geoff. Something was definitely up. Carl could always tell when Geoff had done something that was going to get him into trouble with Dad. It looked like another storm was brewing. Geoff couldn’t seem to resist provoking their father. It didn’t help that

Dad was always holding Carl up as an example Geoff should emulate: Carl, who made straight A's, who had gotten a full scholarship to study celestial administration, who had been accepted to a top Downside university for graduate work next spring. Carl, studious and serious. Carl, the one all the teachers said would go far. Exactly the opposite of Geoff, who zigzagged through life in the same insane, impulsive way he rode his bike.

Geoff and Dad would never get along. They were too much alike.

You could smell the disassembly warehouses through a bulkhead. The tart, oily smell of the disassembler bugs mingled with the rotting trash to create a truly foul brew. They had told Carl he would get used to it, but after three months, he still hated the smell. It was also noisy, with the big vats churning, and fluid hissing and rumbling in the pipes under the floor.

His coworker, Ivan, sat on a bench along one wall, pulling on his boots.

Carl sat down next to him. "I'm back."

Ivan started and gave him a stare. Carl wondered if he was angry. "What are you doing here? I told you to take off."

"The ice is already in. I've a lot of catching up to do. No big deal." Then he noticed how pale Ivan was. His underarms and chest were stained with sweat. "Are you OK?"

Ivan shook his head. "You startled me, is all." He had been out of sorts for the past few weeks. Carl had heard a rumor his partners and children had left him recently.

He had been looking at something in his wavespace. Ivan noted the direction of Carl's gaze. "Ever seen my kids?"

Carl shook his head. Ivan pinged Carl's waveface, and he touched the icon that appeared in front of his vision. An image of Ivan, his wife and husband, and three snarly-haired children unfolded before Carl's gaze. The kids were playing microgee tag in a garden somewhere in Kukuyoshi while the adults watched. The image swooped down on the children's faces, and then moved back to an overhead view. Their mouths were open in silent shrieks of laughter. Carl grinned despite himself.

“That’s Hersh and Alex,” Ivan told him, pointing. “They’re twins. Eight, now. And the little girl is Maia. She’s six.”

“Cute kids.”

He gestured; the image vanished. “I’d do anything for them.”

“Of course you would.” Carl eyed him, worried. Ivan stepped into his work boots and strapped on his safety glasses. “Let’s get this over with.”

“Um, get what over with, exactly?”

“Nothing. I just ... miss them, you know?”

“Sure.” Carl eyed him, concerned.

Ivan glanced around the warehouse. “Listen, will you do a favor for me? I left some of my tools back in the locker room. Could you go get them?”

“Mike will be pissed...”

“Nah, he won’t even notice.”

Ivan had a point. Mike rarely emerged from his office before lunchtime. “All right, sure.”

“It’s a small orange pouch with some fittings and clamps. It’s in my locker.”

Ivan leapt up to the crane operator cage mounted on the ceiling and climbed inside as Carl bounded back down the tube toward the offices. As luck would have it, though, Mike wasn’t in his office; he was at a tunnel junction just down the way. His gaze fell on Carl. “What are you doing wandering around the tunnels?”

“Ivan sent me for a tool kit.”

“I don’t pay you to run errands for the other workers. Kovak can get his own damn tools. Get back to work!”

Carl eyed him, fuming. He did have a way to strike back at Mike. The resource commissioner, Jane Navio, was a friend of his parents, and had pulled some strings to get Carl this job. She was Mike’s boss’s boss’s boss. All he had to do was drop a word in his mom’s ear, and before long, the hammer would come down on Mike.

But Mike's petty tyrannies weren't the commissioner's problem. *Someday soon*, Carl thought, *I'm going to be a ship's captain, and you'll still be slinging bug juice and smelling like garbage*. "You're the boss."

"You got that right," Mike said, and floated off.

Carl went back to the trash warehouse, slapped on bug neutralizer lotion, got his bug juice tester from the benches, and headed over toward the vats. Ivan was working over at Vat 3A. Carl shouted up at him, "Sorry! No tools! Mike's on a tear!" but Ivan was doing something in the cab and did not see Carl, and the noise drowned him out. Oh, well. Later, then. Carl got to work.

Per safety rules, the tester never worked at the same vat that the crane operator did. The crane operator cages rode on rails that crisscrossed the open space below the geodesic ceiling. The cranes had long robotic arms that the operator used to lift the bunkers of trash and carry and tilt the debris into the funnels atop the disassembly vats.

There were two kinds of bugs. Assemblers built things: furniture, machine parts, food, walls, whatever. Disassemblers took matter down to its component atoms, and sorted it all into small, neat blocks or bubbles, to be collected, stored, and used the next time those compounds were needed.

Disassemblers were restricted in town. The specialty ones that only broke down matter of a particular kind—a specific metal, or a particular class of polymer, or whatever—those were the only ones they used down in Zekeston, and even then, only in small quantities. Trash bugs were much more useful—and much more dangerous. Not only did they break down all materials, but they were programmed to copy themselves out of whatever was handy when their numbers dropped too low. That's what they used out at the warehouses.

Carl went over to the sample port on the side of the first vat, put on his goggles, and stuck the probe into the port. Then he heard a guttural scream overhead. Something small flew out of the crane cab and struck the floor not far from him. Something bloody.

He heard a loud crash. Debris scattered. It was Ivan's dumpster—he had dropped it. Carl looked up. The crane's grappling arm pointed at the third vat like a spear, and the crane plummeted straight down toward it. He caught a

glimpse of Ivan's pale, wide-eyed face as first the arm, then his cage, plunged into the vat. Disassembler fluid surged up and swallowed him and the crane. The vat walls buckled, and disassembler fluid spewed out.

Carl dove behind a stack of crates. Too late to help Ivan. The bugs were everywhere. Murky, grey-brown oil surged and splatted against the other vats, the trash, the walls, the floor. Gravity on 25 Phocaea was a bare one-thousandth of Earth's; gobs of bug juice sloshed and wobbled about; the air filled with deadly mist.

The vats were coated on the inside with a special paint that the disassemblers were programmed not to touch, but on the outside they were vulnerable. One after another, the vats blew. As Carl made for the maintenance tunnel he was badly splattered. Burning, fizzing sores opened up on his arms and face. He changed course for the nearby safety showers and doused himself with neutralizer, and the burning stopped. But he felt a breeze, accompanied by a hiss that crescendoed to a shriek. The outer walls were being eaten away. The temperature dropped—sound died away

—holes appeared in the warehouse wall.

He looked around. The bugs had destroyed the emergency life-support lockers. The bug neutralization shower was across the way from the tunnel doors, and frothing blobs and puddles of disassembler were everywhere. By some miracle, the emergency systems had not yet shut those doors—so air was rushing in even as it was escaping out the holes—but with every second it got harder to breathe.

Carl leapt and dodged for the doors, looking for a path to safety. His ears popped. Sound was all but gone now. It made everything seem very far away. The floor was being eaten away, and bug juice poured into the steam and bug piping below. His lungs hurt and sparks danced before his eyes. With a desperate leap, he made it to within a meter of the door ... as the emergency lights finally lit up and the door slammed shut. In that instant before it was sealed he saw his boss Mike, Mike's boss's boss Sean Moriarty, and others scrambling down the hall toward him. Then he bashed into the closed door.

He pounded on it, shrieking, “Help me!”—but could not hear his own words. Pain seared his lungs. He sank to the floor.

Half the ceiling came down around him. Stars blazed overhead. The air was gone. Outside the crumbling warehouse perimeter, next to the crater, the massive disassembler manifolds fell apart and a blast of superheated steam and bug juice shot out and spread across the near faces of the ice mounds. Wave after wave of membranous bubbles, color-coded balloons holding molecular nitrogen, hydrogen, and oxygen, tumbled upward into space as the bugs got to work on the ice.

Carl’s eyesight failed. He curled up in agony. In those last seconds, while others suited up to come out and get him—as the air effervesced in his veins and saliva boiled on his tongue—he used up his last breath on a soundless scream. Not of fear, but of rage, at being reduced to component atoms himself.

* * *

Geoff looked down from orbit and saw the geodesic collapse. He spotted a man go down amid the wreckage. An unsuited man. Then the lumpy horizon swallowed the scene. “Holy shit!”

Geoff checked his heads-up. Orbital time at this altitude was nearly forty minutes; far too long. The guy had ninety seconds, max. Geoff programmed a powered reversal that would get him to the landing pad in just over a minute.

It was a risk. If he miscalculated, he could make a new crater in the asteroid. But the time he bought might save the man’s life. The main rockets cut in and his bike shuddered. The stabilizers kept him from going into a tumble. And the ground sped beneath, dangerously close.

Carl worked in the warehouses. *Don’t let it be him.*

He alerted the others. Someone—Amaya—beamed an emergency message to the life support teams. But all Geoff’s attention was on that uneven horizon. The cable station and warehouses crawled back into view, and as his rockets slowed him, he guided his bike in.

His wheels barked on the landing pad next to the Klosti-Alpha cable, but the pad was too short for his speed. The bike swerved wildly across the concrete and bounced off the edge of it, nearly unseating him. Using braking bursts from his rockets he soared, jounced, and dodged rocks to the warehouse, steering one-handed as he wrestled his spare life bag and pony bottle out of the saddlebag. His buddies were at least a dozen seconds behind him. By the time he reached the site of the collapse, the front face of the ice mountain was roiling and gas was billowing away. A thin mist filled the crater. He heard Kamal's exclamation of dismay as he leaped off his bike. But there wasn't time to think about that. He bounded over the rocks to where he had seen the figure go down.

He saw then he needn't have bothered with the powered orbit. The man was blue, swollen, and stiff: a giant corpsicle. And he did not have to see the face. That was *his* shirt, whose collar showed above the work overalls; Carl had borrowed it that morning. Those were Carl's shoes.

Geoff knelt next to his brother and rolled him over. Carl's eyes were whitish due to frost, run through with dark, swollen veins. His tongue had swollen up, too, and was jutting out of his mouth. His black hair was stiff as straw.

By this time Amaya, Kamal, and Ian had reached them. They recognized Carl, too.

"*Hidoi...*" Amaya gasped. *Horrible ...* Her family had immigrated from Japan and she used .

"Are you sure he's dead?" Kam asked.

"Shit, man, look at him! What do you think?" Ian. "Shut up," Kam said. "Just shut up. All right?"

Geoff stood up again, and looked down at his brother. He did not notice his friends' stares or their words. He felt nothing. But his mind was racing. He was thinking, *Carl can't be dead. This is a dream.* He was thinking, *What if I had paused to let that other biker use the ramp? I'd have been closer to touchdown. Or if I had talked Carl into ditching work and coming out with us.* Fat chance. Geoff would not have even asked; Carl would never shirk his duties.

He was trying to remember the last thing he had said to Carl. He couldn't. He was imagining what the muscles in his parents' faces would do when they heard the news.

* * *

In the few dozen seconds it took Stores Chief Sean Moriarty and his crew to suit up and force the locks open, the college intern—what was his name? Sean struggled to remember. Carl. Carl Agre; that was it—lay dead amid the ruins of the fallen warehouse. Sean indulged himself with a string of obscenities. Not that he was surprised. But he had hoped.

A small group of rocketbikers stood over the body. Sean shuffled over—damned low gee; it was supposed to make locomotion *easier*—and bent to examine Carl Agre's remains. Sean sighed. He was so goddamn sick and tired of burying the dead. He had fought in three wars, Downside; he had seen a lot of young dead. *Hell*, he thought, *I'm a fucking death midwife*.

Commissioner Navio had recommended the kid for the job. Sean was not looking forward to that call.

Then he got a look at the young man crouched beside the body. He adjusted his radio settings till he got a ping. "You related? A friend?"

The young man said nothing. One of his companions said, "He's his brother."

It just kept getting better. Sean waved the responders forward. "Get him inside." He moved in front of the young man, Carl's brother, and laid hands on the shoulders of his pressure suit. The youth would not have felt the touch through the suit. Sean jostled him gently, to get his attention. It was hard to see the boy's eyes clearly, through the visor's shielding, but his gaze looked glassy.

"We're taking your brother inside. We need to notify your parents.

Come with us."

"What...?" The kid seemed to come out of his daze. "Oh."

As they turned, Sean caught a glimpse of Warehouse 1-H, which stood

behind the ruins of this one. It had been hit by disassembler backslash. Chunks were falling off, and Sean could see movement inside through the gaps. People? Yes. Some survivors were trapped in Warehouse 1-H.

“Get a command center set up right away,” Sean told Shelley Marcellina, his chief engineer. “We’ve got people trapped in the rubble over there.”

But Shelley, facing the opposite direction, gasped. “The ice.” She was pointing over his shoulder.

The ice? Sean turned and looked where she was pointing. His view had been obscured by his visor and the outcropping, but from this vantage point he could see it. Interior areas in the ice mountain were glowing. Jets of steam spewed out. He could feel the heat of reaction on his face, even through the visor. Clouds billowed all around. The ground trembled.

Terror surged in him. Three megatons of methane and water—the air, water, and fuel for over two hundred thousand people—was going up in wafts and jets of superheated gas.

“It’s a runaway. The reaction has outpaced the bugs’ half-life. We’ve got to stop it.” Sean sprang upright. “Let’s move, people! Move!”

Everyone hustled inside, two technicians carrying the body of Carl Agre. His brother, the young rocketbiker, and his friends followed behind.

Before he moved Upside and became Phocaea’s deputy commissioner of stores and warehousing, Sean had spent fifty-five years in the military. And if there was one thing he had learned, it was how to move fast in a crisis. Within minutes he had a command center set up, designated lieutenants, established priorities, and enacted communication protocols. He organized a team to pump neutralizer out to the ice, a team to check the bulkheads and seal off breaches, and a team to rescue those stranded in the other damaged warehouse. People were bringing in the injured; he assigned the medical techs to set up triage and first aid. Everyone scrambled. Then he and his engineers laid down maps and piped in live images of the ice.

Sean swore. The damned thing was nearly seven hundred feet on a side, and in the twelve minutes it had taken to set up command and lay the hoses, the ice was over a third gone. *We’re screwed.*

“Shelley, the hoses are way too slow. We have to get that bug-killing juice out there *now*. And the reaction is occurring in the core, where the heat is trapped. Not around the bottom edges.”

His chief engineer frowned at the images. “All our mobile equipment is down in Zekeston. Everything out here is on tracks in the domes.” She shrugged, looking grim. “There’s not much we can do but lay hose and pump.”

“We’re dead, then,” Cal, a disassembler programmer, said. “We can’t stop it. We’re dead.” His voice rose at the end to a shriek. Heads turned.

“Calm down,” Sean snapped, angry that Cal said what he had been thinking. “I need ideas. Not hysteria.”

“We can dive bomb it,” someone said. “Hit it from above.”

Sean did not recognize the voice. He looked around. It was the kid, the one whose brother had just died. He stood at the opening to the triage area, helmet tucked under his arm.

“Who let him in here?” one of the engineers asked, but Sean felt a tingling in his scalp. The rocketbikers and their nets, the kid meant. They could dive-bomb the ice, kill the reaction. “Go on.”

The teen lofted himself over. His friends hung back.

He was tall and gangly, straining his suit at the wrist and ankle joints. He had black hair in a longish cut that looked like an afterthought. He was talking in a monotone. Sean could not believe he was able to form coherent sentences at all. “The gang is all out there right now. Right?” He glanced over at his friends. “Right?”

The young man’s companions moved closer, outside the ring of engineers. The young woman nodded slowly. “It could work, I guess.”

“How many?” Shelley demanded. “How many are there?”

“Fifty,” Carl’s brother said. “Maybe more. We have our own comm frequencies.” Smart kid. He had realized how critical communications were—and how long it took to set them up if you didn’t already have a system in place. “We’re used to moving fast. To get the first ice, you know.”

He leapt up again, and floated above the maps, spread-eagled. Finally he

settled onto the table cross-legged, and eyed the map from all angles. "Take a look," he said to his friends. "What do you think?"

The engineers made room for the other three. "Our ramps are over here, on the other side of the lake," the bigger boy said. He studied the map and pointed. "If your neutralizer can tolerate the deep cold and you can get the supplies out here next to our launch ramp in packages that fit in our nets, we can throw them at the mountain from low orbit."

His friends were nodding. "It'll work," the young woman said.

"What the hell are you talking about?" someone said, but Shelley got it. "Like slingshots. They'll drizzle right down into the center of the ice, shut down the reaction." Another of the engineers protested, but Shelley insisted, "It's our best shot. If they can pull it off."

Sean gave the boy a searching look. "What's your name?"

"Geoff." The kid's voice cracked, whether from stress, grief, or ordinary hormones, Sean could not say. Maybe all three. "Geoff Agre."

"All right, Geoff, get off the goddamn table." The boy obliged. More graceful than he looked. Sean laid a heavy hand on the young man's shoulder as he touched down. Sean could tell the boy needed contact. He might have great ideas, but his gaze was still glassy, and he looked as if he was about to float off into space. "Here's how it is, Geoff. We've got precious few supplies of neutralizer, and less time. You just saw your brother die. Are you going to fall apart on me up there?"

Anger glinted in the boy's eyes. Sean liked that better than the blank stare it supplanted. "No way!" He struggled for control. "No. We can help you. If you'll let us."

"You'll have to take orders from Shelley. All of you. Without question or hesitation. Even if you don't like what she tells you to do."

The kids surveyed Shelley, who eyed them back, a corner of her mouth quirked up. He looked at his companions, eyebrows raised. One by one, they gave him a nod.

“All right,” he told Sean. As if he could make such a promise. The arrogance of youth. But hell; why not? Maybe the rest of the bikers would listen to him. At this point, the cluster had nothing to lose.

“You’re up, Agre. Shelley, you lead the op.”

* * *

They suited up and headed out. Geoff was still shaking. He could not believe he had said what he had out loud. Worse, Moriarty had listened. Now he had to act, fast, when all he wanted to do was curl up somewhere.

He kept seeing how Carl’s face had looked—the swollen body, the frozen eyes, the bulging veins. The world had shrunk, like he was seeing it through a long tunnel. Everything was happening in slow motion.

He remembered the old man’s face as he had challenged him. Geoff had told Moriarty he could do this. If he could not keep his shit together, he should have said so then.

The big blond woman, the one they called Shelley, was talking to him. Near them, the cluster’s ice was boiling away. If that wasn’t a good enough reason to suck it up, he may as well take off his helmet right now.

For you, Carl, he thought. *I’ll do this, because you would.*

“... to get your friends,” she radioed. “We need them now. Whoever you can muster in the next three minutes. Less, if you can.”

“What do we need to know about the bug neutralizer?” Kamal asked. “The juice comes in five-hundred-kilo bladders. It’s not damaged by cold, but it needs heat to liquefy. Solid, it’s useless. And you’ll have to break the packaging. The ice is hot—the packaging should melt on impact—but to be on the safe side, you’ll need to hurl them hard. That means low, powered orbits. To shut down the reaction you’ll have to blanket the ice, which means you’ll need to come in from different angles, at high speeds. In other words, it’ll be a death derby up there.”

Amaya asked, “You know biking?”

“I know orbital mechanics. Think you guys can handle it?”

The four of them looked at one another. This time it was Ian who replied. That was fine with Geoff. He had done all the thinking he could handle for now. Now he just needed to go and do. He needed to outrun what he had just seen. “We can handle it. We’ll be at the pickup spot in three.

“All right,” Ian said, as they bounded across the landscape toward their bikes, “Geoff, you take one ten nanometers; Amaya take one sixteen point five; and Kamal, you’re one twenty-two. I’ll take one twenty-seven point five. Let’s start making calls.”

Geoff switched his comm frequency to the first biker channel and leapt onto his bike.

* * *

Sean got notice his boss, Jane Navio, was on the way up. He suited up and stepped out onto the commuter pad as she and a dozen Resource Commission staff poured out of the lifts. She spotted Sean.

“I come with extra hands,” she radioed. “The big equipment is on its way. It’ll be here in twenty minutes.”

“Too late to do much good, ma’am—but the extra hands will help. We need them badly.” He directed the new hands to Cal for assignments. Then they two bounded over to the crater.

“What happened?” she asked.

“Disassembler disaster in Warehouse 2-H. It set off a chain reaction and we have runaway disassembly in the lake. We lost two crew when the warehouse came down.” He hesitated. “One of them was that young man you recommended for the position last fall. Carl Agre.”

She was looking out at the vanishing lake. She did not say anything for a second. He watched her struggle with it.

“All right,” she said softly. “All right. We’ll deal with that later. What’s happening out there?” She gestured at the bikers dive-bombing the dwindling ice pile.

“They’re helping. Trying to stop the reaction.”

Jane eyed the scene. “We’re down at least seventy percent. More. Damn.” The look on her face said all it needed to, even beneath the radiation shielding. Then Sean’s words registered. “So we’ve recruited bikers? Ah, to dive-bomb the ice with neutralizer. Clever! My God.” She eyed Sean. “Is it working?”

He squinted down at the ice: what with the mist and the boiling and splashing, it was hard to tell. “It’s better. Don’t know if it’s enough.”

She turned, taking information in. She pointed toward the ruined warehouses. The woman was like a fucking computer.

“What happened to 1-H, over there? Oh—I see. Partial collapse due to bug backslash from 2-H. Jesus. That must have been a violent reaction. We need to know what caused that. All our simulations said the bugs should have frozen first. I see activity inside. There’s a crew in there?”

“Several are trapped in the rubble,” he replied. “They got to the emergency lockers in time, but they’re buried under debris and they only have pony bottles and rescue bubbles, so they only have a few more minutes of air. We have to hurry.”

She scanned further. “And that team?” She pointed to the workers guiding the neutralizer packets from the warehouse air locks. “They’re taking the neutralizer to the bikers?”

“That’s correct.”

It was a long way from the warehouse locks, across the commuter pads, past the hangars to the rocketbike launch pad. It took four people to push-pull each neutralizer bladder. The supply chain inched along. Jane gestured at the biker ramps. “There are bikers backed up and waiting for the neutralizer, Sean.”

“So?”

“So,” she said, “you’ve got a resource bottleneck. Even with the new hands helping, it’s going much too slowly. We need every gram of ice we can rescue. The last thing we can afford right now is a bottleneck.”

Her meaning became clear. Sean glared. “If I reassign the rescue team to the neutralizer brigade, the crew trapped in the warehouse will die.” *My people will die.*

“Sean. I can tell by looking—we’re losing about a day’s worth of ice every minute. I checked the shipping ledgers on the way up from Zekeston. There’s not another ice shipment coming Down anytime soon. I don’t know how I can keep everyone alive till we get another shipment, even if the runaway were stopped this very instant. Hundreds of thousands of lives depend on how much ice we can save. We don’t need your team for long. Maybe another fifteen minutes. Then you reassign them to the warehouse.”

Sean shook his head. “Fifteen minutes is too long for those people trapped in there. We’ll lose them.”

She looked at him. “The cluster has to come first, Sean. There’s no time to argue. Get someone to throw them some more pony bottles and then get your team out to the juice brigade.”

“There’s no way to get them ponies or air lines, or we already would have. You’re telling me to abandon them.”

The commissioner said, “Then you’re right. I am.”

Sean stared. He had been here before. After a long and honorable career, he had been dishonorably discharged, during the Gene Purges, for disobeying orders. But those had been stupid orders. Evil ones. These weren’t. Jane Navio was a chrome-assed bitch, damn her. But she was right.

“Reassign the warehouse team to the neutralizer brigade,” she repeated. “Now.” And he did.

* * *

Geoff remembered the biker chatter in his headset. He recalled dodging other riders, dragging nets filled with neutralization bladders, dropping them, watching them crash onto the shrinking mound of ice, while Moriarty’s engineer Shelley gave targeting and pickup instructions—then landing, waiting while technicians loaded up their nets, and taking off again. But everything blurred together in a jumble of events.

He did remember one pass in detail. He and Amaya went in low enough that the net dragged the top of the ice. They dodged ice crags and sudden spurts

of superheated gas to drop the packet into a crevice deep in the ice's center. He caught a glimpse: the boiling ice looked like lava in a cauldron. Then they veered upward amid towering gas columns.

Another team veered into their nets as they rose, and Geoff got yanked off his bike. He spun wry—the stars, the flares of the other bikers' rockets, Phocaea's surface, all tumbled past. He had no idea where his bike was, or where Amaya was. He feared he'd plow into Phocaea's surface, but after a moment he realized he'd been thrown upward, out of Phocaea orbit. His breath slowed. Numb calm fell over him. He breathed in and out. Dots of fog appeared and vanished on his faceplate.

Amaya was back there, somewhere, circling back around for him. He was sure of it. But for a moment he thought it might be good if nobody had noticed, and he could just float away, off into the Big Empty.

Then she radioed him that she was approaching. She shot a net that snared him. Geoff grabbed at it, climbed along it to her bike, and mounted behind her. She fired her rockets and took him back around to his own bike. Neither spoke a word.

As he mounted his bike, she finally asked, hesitantly, "You OK?"

"I will be." It was hard to believe that only a half hour ago he had been so excited about his bug-turd art project. He had thought he was such hot shit. Now it all felt like a waste of time.

He shook it off. *Don't think. Just do.*

* * *

Half an hour after they started, Shelley gave the all-clear. By the time the reporters and their cameras had started showing up, most of the bikers were down, gathering near their hangar, checking their equipment. Geoff coasted to a stop and launched himself off his bike. He ached. He could smell his own sour stink, and though slimed in sweat, he was shivering. Dully, he wondered if his climate controls were malfunctioning. He shuffled clumsily over to the crater lip, near where he and Carl had been standing less than an hour before, and leaned

over, hands on his thighs.

When he straightened, the mist in the crater was clearing. The pale sun rose low over the horizon in the southwest, and cast long shadows across the still steaming wreckage. The stars faded from view. The crater floor was covered in a graphite slick, with neatly spaced blocks on top in yellow, red, and an assortment of metallic hues. In the crater's middle was a lump of dirty ice about half the size of what they had had before the delivery. A couple weeks' worth, maybe. No more.

Amaya came up next to him; he recognized the stickers on her suit sleeve. He could not see her face well. But he knew what she was thinking. "There's always other shipments coming Down," he said. "My mom says Commissioner Navio is a genius at making the ice last. We'll get more in soon. It'll be OK."

"Yeah," she said.

Shelley alighted next to them, and slapped Geoff and Amaya on the back. "You all saved us. Good work." She bounded off toward the warehouses. By then, Kamal and Ian had found them.

"Aren't you going to talk to the reporters?" Kamal asked, and Ian said, "You should get over there. This was your idea. You deserve the credit. Not those clowns."

Geoff shook his head. "Nah. Gotta bounce."

Kamal and Ian protested, but Amaya said, "Lay off." And to Geoff: "We'll talk to the reporters. Catch you later."

"Yeah. Later."

No point in delaying the inevitable. It was time to face his parents, and their disappointment that it was not Carl, but he, who had survived.

3

Back in Zekeston, Jane and her team got to work on inventories, damage reports, alerts, rationing plans. Hours passed in a blur. Marty Graham, her aide, followed her into her office, holding out two pills and a bulb of water.

“What are those for? I feel fine.”

Marty Graham, barely twenty-eight, was a recent transplant from Ceres. He had just gotten engaged. He had not been with Jane long, but had quickly made himself indispensable with his ability to fend people off without angering them, and to anticipate what she would need next in order to do her job. On the other hand, he could be rather a pest, and when she saw the pills and vial in his hands, she waved them away. “I’m fine.”

“Honestly, Chief, don’t be a baby. You’re exhausted. You need to be at your best.” He held up one capsule. “Clears out the cobwebs.” He held up the second. “Stimulant. Medic’s orders. None of us are going to get any sleep for a while. May as well enjoy it.”

He pressed them into her hands. She eyed them sourly. “All right, all right.” She swallowed them. “Has the prime minister gotten my initial report yet? When does he want his briefing?”

“I just got confirmation from his office a moment ago. He’ll see you in half an hour.”

“Good. Call Sean, Aaron, and Tania in.”

“In person?”

“Yes. I’ll want a meatspace meeting for this one.”

“Will do.” He left, and her office door closed behind him. Jane’s three direct reports entered—Sean of Shipping, Stores and Disassembly; Aaron of Utilities and Assembly; and Tania of Computer Support Systems.

“Come in,” she said, and entered the privacy code to her waveware. The tailored drugs did their work: a chemical wave of well-being and strength moved through her, and her thoughts cleared. *OK, Marty; you were right*, she thought, but she was still scowling. She did not like to depend on a pharmacy to function.

They waited while dead “Stroiders” spy glitter drifted toward the vents, and the “Stroiders” broadcast signal in her heads-up display went out. Gravity was light enough here that the room had no official ceiling; as with all the low-gee parts of the city, they bobbed gently in various shifting orientations around the conference room, twirling slowly and touching surfaces to guide themselves back toward the center. All but Sean, that is, who clung to a handhold: as a Downsider, he was uncomfortable with the tumbling indifference to which end was up that native Upsiders had.

“This will be a quick meeting,” she promised once the mote dust had cleared, “and then I’ll let you get back to work.”

As resource commissioner, she had a budget of twelve offline hours per workweek. During a crisis, as commissioner, she could invoke emergency privilege and take more. The fees were high—and she had no doubt that Upside-Down would bring pressure to bear to keep access open to her department, where the core of this drama was playing out. So be it.

“Sean, how many did we lose, up top?”

He twisted to look at her, and the banked fury in his face told her the news was bad. Hazel-eyed, black-skinned, gray-haired, and tall, Sean Moriarty sported broad, military-stiff shoulders. Deep lines engraved his forehead. He was at the edge of old age, pushing the century mark. “Besides Agre and Kovak? Eight.” His voice was hoarse.

Eight. She had killed eight. She released a slow breath, but did not allow herself to think about it. Not just yet. “I’m very sorry.”

He gave a sharp nod of acquiescence. “Send me their names,” she said. “I’ll notify their families.”

“Thank you, ma’am.” He made a gesture in wave, and her waveface acknowledged receipt of the file. “Fourteen warehouse workers were injured, in all, most of them minor. The list is also attached.”

“I’ll contact them as well, then.” She’d have to do it after her emergency meeting with the PM. She shot the files off to Marty, with a note to fit the notifications into her schedule.

Aaron Nabors was still young, around forty, with blond hair, freckles, and pale skin. His brown eyes were shadowed with fatigue and worry. You would think he had spent the night in half a gee, the way his shoulders slumped and his face muscles sagged.

“What are we down?” Jane asked him.

“Let’s see.” Squinting, tumbling slowly, he ran his finger across invisible icons. Graphics and figures sprang up in their shared waveface, in response to his words. “The city infrastructure assemblers took a hit during the initial disaster, when nutrient flow was disrupted, but we’ve got that back online now, and the bugs are regaining their base numbers, feeding on enriched bug juice as well as their own dead. We’ll be fine there.

“Materials and parts. We’re OK as long as the assemblers don’t hit their reproductive limit for another few days. We have an emergency shipment of parts and equipment scheduled to arrive a couple months from now. We can probably limp along till the bugs are back up to full capacity.

“Food. The food assemblers weren’t touched and we still have plenty of raw stock. So starvation isn’t an immediate threat, praise God.”

He paused to wipe at the sweat beaded on his upper lip. Jane raised her eyebrows. “Air, water, and power?”

He gestured. Images played in the small group’s center, showing the impending collapse of Phocaea’s resources. He played it through, tweaking the

inputs to show them three or four simulations in succession, and froze them in a patterned layout. He pressed his lips together and let Jane and the others study the readouts.

“This one can’t be right,” Sean said, pointing at the temperature display. “The temperature levels off at minus ten C or so, and only drifts down a little after that. I thought the big risk was freezing.”

Aaron replied, “No, not at all. We’ve dumped too much heat into this rock over the decades. It insulates us. It would take a year or more for the city to cool down to a truly dangerous level. It’ll get cold in here, but not deadly cold.”

“Not deadly to humans at least,” Jane said, thinking of the arboretum. “The real risk is the toxins. Contamination in air, water, and food supplies, as our assemblers and disassemblers die off.”

“Slow suffocation, poisoning, and famine,” Tania said, with a gallows grin. “We’ll steep in a stew of our own excretions. Mmmm!”

Jane gave Tania a sharp look. Tania had the decency to look sheepish. Jane pulled the calculations and graphs over, reorganized them, and examined the parameters Aaron had put in. “Your simulations are saying that if we preserve hydrogen fuel for the power plant we can’t begin to rebuild the disassembler base.”

“Correct. If we don’t leave enough for Sean to build up his disassembler population fast, even if we do get an ice shipment in time, we won’t be able to convert enough oxygen to support our people.”

“Give me a date. How long do we have?”

“With strict rationing of fuel, water, and air, and optimal balancing: twenty-six days. That’s the best I can do.”

Jane heard Sean or Tania inhale. She had known, though. “Several dozen families will be falling off the ends of the treeway before then,” Aaron said, “and will either need to be restocked or brought in. That will have to be your call.”

“Bring them in. Standard protocol.” Standard protocol: they were welcome to refuse the official invitation to camp out in Zekeston or one of the other two towns till the supply crisis eased, but did so at their own peril.

Stroiders were a frontier-minded lot. If some fool fell off the treeway insufficiently stocked, and many years later on the other side of the sun ran out of supplies or had no way back, well, too bad, so sad.

Of course, the reality wasn't quite that harsh. If Phocaea could do something for its citizens beyond the edges of the treeways, it did. Especially if there were children, or if they had racked up a lot of good-sammies. A fleet of craft cruising retrograde in Phocaea's orbit performed antipiracy and search-and-rescue operations.

But troubles were many, space was vast, and rescue craft were few. Those who had chosen to fall off the treeways not fully stocked were given a lower priority than those who had simply gotten caught in a crisis not of their own making. And this meant that children frequently ended up as victims of their parents' pigheadedness and poor planning. Reading reports of the frozen bodies found on faraway stroids always pained her. But in a wilderness society where there wasn't always enough fuel and air and water to go around, people fell out of touch all the time, they had little choice.

"Will do," Aaron said.

"What about odor management?"

"I've cut the control system back by thirty percent," he replied. "It'll gradually get more pungent, but won't be really bad for a week or so."

"Well, but we are going to have an extra twenty or thirty thousand people coming in from the burbs," Tania said.

Aaron shrugged. "I accounted for that. I checked the actuarial stats for significant violence and suicide impacts, and kept us below that line."

"OK, is that it?" Jane asked. Aaron nodded. "Resource accounting," she said. "Any good prospects from the citizenry?"

Aaron said, "The banks report a small but steady trickle of ice claims coming in. A few sugar-rock reports, but none have panned out. I do not expect them to alter our numbers appreciably."

"Sugar rocks?" Sean looked confused. He was a fairly recent Downsider émigré.

Tania explained, “The First Wave miners used to hoard methane and water ice inside their claims, as they tapped them out.”

Aaron said, “It’s usually a waste of time to bring them in—a large amount of effort for only a little ice—but once, forty or fifty years ago, a sugar rock made a big difference for the Eros cluster. The university is pairing up with the banks to investigate the claims.”

“Every little bit helps. But we can’t count on sugar rocks to save us. Could you send me your resource balancing calculations?” Jane asked Aaron. “I want to run through them myself, see if I can squeeze anything more out of the system.”

“Of course.” He pulled up his waveface and sent her some files.

“So,” Jane said, “other ice sources. Perhaps from one of the other clusters?”

Sean replied, “Our fellow stroiders—the ones inclined to help, anyway—are all too close to depleted themselves. Saturn, Mars, and Earth are all near opposition—too far away to do us any good. Jovespace is our best bet. I’ve already authorized an emergency expedition. They are outfitting a tug and barge, and will leave tomorrow—I mean, this afternoon.”

“How soon can they get us ice?”

“Eight weeks, earliest. More likely nine.” A five-week gap. Not soon enough!

Aaron said, “I have received word from Ilion on an interesting lead. A three-million-ton shipment of methane ice is coming Down from the Kuiper belt, destined for a construction project on the moon. That’s the only major ice shipment within four months’ travel of us.”

“*What?* But that’s all we need! No way anyone would refuse us a reasonable deal. Why didn’t you tell me before?”

Aaron looked apprehensive. “Well, there’s a complication. The ice is owned by Ogilvie & Sons.”

Ogilvie & Sons. The Martian mob. *Shit.* She pinched her brow. “Where is it now?”

“Hitting a parking orbit near Ilion, late today.”

Most of the ice that sustained the space colonies came from the Kuiper belt. It took a *really* long time to ship ice from out there. The Kuiper belt was much farther out than people realized—at least thirty times as far from the sun as Earth; nearly ten times as far out as the Phocaeen cluster. This left little margin for error. Still, it was much cheaper to ship ice from the outer system than it was to try to lift it from the outer moons' gravity wells.

With Kuiper objects, all you had to do was give the ice a nudge, and down into the sun's gravitational well it came, faster and faster, like a big dirty ball of ice rolling down a hill. The real problem was stopping it once it started. Quite understandably, Earth was paranoid about Upsider rocks screaming into the inner system at high speeds. Earth had had enough impact extinction events to last it, thank you very much. By interplanetary treaty, if an Upsider shipment crossed Mars orbit at greater than twenty thousand meters per second, it was confiscated or shot out of the sky with Earth's high-energy beam gaxasers. So shippers usually aimed their shipments at Saturn or Jupiter, using the gas giants as gravitational brakes. They settled the shipments into orbits between Saturn and Jupiter, and when they were ready to ship them farther Downward, strapped engines on and sent them to their final destination at safer speeds.

"The ice could be here in about three weeks," Aaron finished.

"About?"

"Twenty-two days, soonest, according to my calculations."

"Right in the very nick of time," Sean remarked.

"Yes...what a strange and remarkable coincidence," Jane replied.

Tania said, "I can't see Ogilvie & Sons giving us a trillion troy's worth of ice out of the goodness of their hearts."

"No," Aaron agreed.

Jane said, "Very well. Thank you. Sean, what about the warehouses?"

"Repairs of the housing structures and storage tanks will start soon," he replied. "Our biggest problem right now is the disassembler circulatory system. We don't have all of the parts we need to actuate the manifolds, and the codes for reassembling them were damaged during the incident. But my people are

jury-rigging a bypass we can use till the parts come Up from Mars in six months. It'll be crude, but we can make it work. I expect it to be operational by next Tuesday or Wednesday."

"Make it Tuesday."

"You got it."

"So what about stores? Give me the numbers."

"At least one hundred forty million troy's worth of pressure-sensitive goods in our warehouses were destroyed. The rest is inaccessible till our crews and equipment are freed up. The owners are screaming bloody murder. Several critical undamaged shipments are being held up due to the ship confiscations. I'm getting complaints out my ass. Shipping's clients are screaming. The insurers have their investigators breathing down my neck."

"Who would have thought it."

"We'll lose business. Pallas, Vesta, and Ceres are vying to cut us out."

"I know. Can't be helped. Until we have a source of fuel on its way, we have to be conservative. "

"Yes, ma'am."

She grinned at his reflexive use of the military honorific. "I'll set aside some time tomorrow to make a few calls and smooth things over with your customers and talk to the insurers. Ask Marty to set up a couple of calls."

"It would be a big help."

"Zap Marty the names and addresses, and copy me."

He nodded, and scribbled with his finger in midair. She scanned the list as it came across her waveface. As she had suspected, two of last night's callers were on the list. "What about the driver?" she asked. "Any more details on how it happened, or why?"

That angry look moved onto his face. "The police are investigating Kovak's background. I'm meeting with Jerry and getting a full briefing at noon." The chief of police, Jerry Fitzpatrick, was a good friend of Sean's.

"What do we know?"

“Apparently he was in a group marriage. A month ago his partners ran off with each other and the children. He’d been on antidepressants and seeing a spiritual guide.” Great, a religious nut. Jane sighed. “It appears he killed himself with an overdose,” Sean finished. “Why he chose to take his coworkers out with him...” He hunched his shoulders.

“It may not have been a deliberate act—”

“It might as well have been,” he snapped. “Suicide-murder. If he were still alive I’d kill him myself. Space the fucker.”

Jane pinched her lip, observing him. Finally she couldn’t help herself. “None of us saw this coming, Sean.”

“Don’t patronize me!” He slammed a palm down, making them all jump and sending himself into a slow backward spiral. He righted himself. “I watched a kid die while we were trying to get the doors open. It’s Kovak’s doing. He deserved to go out a lot more slowly and painfully than he did.” There was a tense silence. Tania and Aaron exchanged looks. “Are we done? I need to get back to the warehouse.”

“We’re not done. Sit down.”

Sean glared at her, an intimidating hulk of a man. Jane glared back. She wondered if he was going to disobey her. But his military training took hold, and he settled back onto his seat. The only evidence of his agitation was his fingers drumming a beat on the table.

Jane said, “Tania.”

Tania Gravinchikov was a short, plump woman in her early sixties. Her red hair and clothes were rumpled, and her pale grey eyes were as bloodshot as Aaron’s and Sean’s. But this crisis did not weigh on her as it did for Aaron or Sean; for her it was like surfing a tidal wave. She flashed Jane a smile. “We’ve been running checks on life support, and something odd was definitely going on.”

“Odd?” Jane frowned. “What do you mean?”

“I mean the life-support computer systems suffered a mini-nervous breakdown in response to the crisis. You know those doors in Warehouse 2-H?

Well, my code jockeys tell me they stayed open longer than they should have. Much longer. And they were big doors. The influx of air from the maintenance tunnels kept the dome temperature from dropping as rapidly as it should have. If the doors had closed when they were supposed to, according to our projections, the bugs would have frozen per the design specs, before they chewed through the warehouse walls, and the damage would have been much less severe. The release wouldn't have reached the lake, and only Kovak, the driver, would have been killed—the bugs would likely not have destroyed the emergency life-support lockers before Carl Agre could get to them.”

Jane pondered that. “Have you isolated the problem yet?”

“Not yet. We’re working on it. We’ve combed through about ten million lines of code so far. Imagine, Jane, some of our life-support tech goes back to the first lunar base! You should see the stuff we’ve dug up!” Tania spoke with an enthusiasm only a software designer could feel. “I’m finding all sorts of ancient oddities,” she went on. “Did you know we’ve got chunks of code written by Pater de Felice and his monastic or—”

Jane cleared her throat pointedly.

“Anyw-a-a-ay...” Tania continued, “we’re closing in on the problem code, but there won’t be much to report until we actually corner the bug, or bugs, that caused the problem. We’ve been able to replicate many of the conditions that caused the failure, though—in simulation, of course,” she added hurriedly, seeing their looks of alarm, “and we’re getting interesting results.” She gave Jane a meaningful look. “I fully expect to have answers by this afternoon and be able to present you with some options for next steps.” Jane got Tania’s meaning: she expected to know how it had happened by the time of their offline meeting at one-thirty. Perhaps even how to fix it? Jane did not want to get her hopes up.

“Anything else? Comments?” No one replied. “Very well. Use the eyes-on list for any new developments. Let’s get to work.”

* * *

Her heads-up reminded her with an increasingly urgent graphic that the “Stroiders” privacy costs were stacking up, so she approved the cancellation of the privacy screen. The “Stroiders-live” icon lit up her waveface, and a handful of miniature rovers crept into the room, along with a wave of motes, as her staff left.

Jane called up her staff’s reports. Ogilvie & Sons, eh? An awful hunch took shape. She summoned her analytical sapient, Jonesy, and had it pull all available shipping logs for Ogilvie & Sons and its subsidiaries, going back eighteen months. Jonesy tossed them into a space-time mapping program, and plotted the ships’ trajectories, while Jane sat back and watched. The tiny dots—Ogilvie & Sons shipments—crawled around the solar system at 10x speed.

She had to rerun it several times to be absolutely sure. Ogilvie & Sons had a fleet of about sixty ships it owned or leased. Before about ten months ago, they all moved around the outer solar system in a random shipping pattern—dropping cargo here, stopping for repairs and new orders there. But starting late last year, two dozen of those ships—only the owned ones; and always their newest, fastest, and best-armored models—began a complicated dance that (a) involved a trip to Mars, and (b) thereafter, zigzagged their way to various points in the asteroid belt within about a million kilometers of 25 Phocaea, where (c) at some time within the past two weeks, they docked for repairs or temporary decommissioning.

One last thing to check. *Upside-Down may not have their cameras shoved up your asses*, she thought at the Ogilvies, *but I have other ways of finding out what you’re up to*.

She sent Jonesy out onto the Solar wave, and in a while it brought her reams of Mars imagery—all online and available for free. She studied various tourists’ and satellite photos of the docks where those ships had landed, for a range of dates surrounding when the ships had touched down. What she found was every bit as bad as she had feared. Jane had Jonesy gather all these images, do some calculations for her, and organize the rest of the data for her presentation. Then she sat for a moment, pressing palms to her eyes.

She did not want to dredge up her long-buried memories of her stint on Vesta, and what the Ogilvies had done there. But Benavidez had never taken the

Martian mob very seriously. If he failed to this time, Phocaea would be lost. She changed into a clean suit and then lofted herself up the Easy Spokeway to the prime minister's offices.

An angry mob of ships' captains and owners clogged the entry to the prime minister's antechambers. Their vessels had just been confiscated—she had heard it on the news. The faces she recognized among them might as well have been strangers'.

Security made a path for her. Her bad-sammy bar crept upward as she moved through, a growing red stain at the right-hand side of her vision. Shouts of “Who do you think you are?” “Fascists!” and “When do I get my ship back?” accompanied her. The air was thick with mote glamour.

In open public spaces, particularly when the event had a high enough newsworthiness quotient, Upside-Down Productions dispersed spy motes in mass quantities. The first time Jane had seen them, she had thought they were beautiful. Now they filled her with loathing.

Then she passed through the prime minister's “Stroiders” barrier: a curtain of moist, floral-scented air that expelled the choking clouds of “Stroiders” motes. She drew a deep, relieved breath.

Benavidez was one of only six people who lived in a bubble perpetually protected from “Stroiders” scrutiny, and all his support staff benefited, at least during their workday. She envied them that.

Jarantillo, one of Benavidez's senior administrative staff, greeted her. “It's getting ugly out there.”

“No shit.”

He preceded her from the entryway into the antechamber itself. A famous hand-blown glass sculpture, *Beatnik Jesus*, showed Jesus wearing swimming trunks and an unbuttoned Hawaiian shirt made of stained glass that rippled out behind him in an unseen breeze. He balanced on his toes, arms joyfully outspread, hair whipped around his face as he looked back at the blue-green wave that broke over him. It had been a gift from the president of the Christian Federation of American States, on Benavidez's election. Above the executive assistants' cubbies, a Ceren upside-down plant spread willowy, orangy green

tendrils across the ceiling, its roots sprouting purple flowers heavy with yellow pollen; a collection of Jovian lightning-bulbs crackled and flashed, bobbing in a convective column of colored gas, against one wall. Beyond it was a honeycomb of small offices and cubicles, where people crouched over screens at their workstations, shifting anxiously, exchanging whispers.

Jarantillo shook his head. “I saw two of my neighbors out there. What if they attack us on our way home? Val”—the security chief—“said he couldn’t give my people escorts.”

“Don’t worry,” Jane said. “They’re just caught up in the initial shock. Val’s people will get them dispersed soon enough.”

He nodded, but didn’t look any less worried. “I’ll let the prime minister know you’re here.”

A few moments later, Benavidez’s chief of staff, Thomas Harman, ushered her into Benavidez’s office, along with Val Pearce, head of city security, and Emily Takamoro, his chief media advisor. Val was tall, balding, and stout; Emily short and slim, with a pretty face and a streak of white in her dark hair. As the door shuttered closed, she saw that Benavidez was lounging in the conference room webbing. He was big and muscular, with olive skin and dark brown hair and eyes. Usually his affect was cheerful and easy, but not tonight.

Benavidez rubbed his eyes. “Let’s get started. Jane, I’ve asked Val and Emily to join us: Val because of the obvious security implications, and Emily because of the public relations angle.”

“Very good, sir.”

“Have you had a chance to prepare the latest resource report?”

“I have.” She called up her interface and tied them all in. A series of tables and charts unfolded in the space between them.

“Phocaea normally uses fifteen to eighteen thousand tons of mixed methane and water ice per day. I can crank that down to about twelve thousand with strict rationing, and we’ve already taken the necessary measures. We’ve got three hundred nineteen thousand tons. I’ve created a countdown clock.” She transmitted the app. “It’ll load permanently onto all your interfaces as soon as

you activate it. It's set at twenty-six days, four hours, and"—she checked the time—"two minutes. That's our best current estimate of how much time we have left."

"Three and a half weeks?" Benavidez said.

"That may change a little, as we improve our inventory numbers. The clock will be automatically updated as new information comes in. Mr. Prime Minister, I'd like to transmit this clock to the rest of your staff as well. It'll be important to their emergency response efforts."

Benavidez pondered for a moment. "We're going to keep the precise time under wraps, for now, and simply tell folks that we have several weeks. I want us to have space to come up with alternatives. Speaking of which..."

Jane nodded, drew a breath. Here it came. "I've just learned that Ogilvie & Sons has an off-ledger shipment hitting Jovespace soon."

The look of relief that washed over Benavidez's face was so intense that Jane had to suppress a wince. "My God! Why didn't you tell us this before you started talking about how we only have three weeks to live?"

"Because, sir, with all due respect, this does not save us. Ogilvie & Sons is a grave threat."

He looked irritated. "Yes, yes; Ogilvie & Sons has connections with the Martian crime syndicate. But what can they do? If they try to impose unrealistic conditions or constraints in the contract for the ice, we simply declare sovereign immunity from their claims. If they make trouble with our shipping contracts later in retaliation, we come up with strategies at that time to protect ourselves. We are not without allies, Upside or Down."

"They are not just connected with the Martian mob. They *are* the mob. Philo Ogilvie, chairman of Ogilvie & Sons' board of directors, paid for a hit on a Downsider judge. He can never set foot on Earth again without facing charges of racketeering, tax fraud, and conspiracy to commit murder. He's confined to a few hundred square kilometers in the Libertarian Free Zone on Mars. His sons are running the company, and they may not have been convicted, but they are as thuggish as he ever was. His elder son, Morris, is reputedly responsible for the Vestan coup, and his younger son, Elwood, by all reports is eager to outdo his

brother to vie for mob boss.

“Furthermore, I’ve become convinced the warehouse disaster was no accident. Ogilvie & Sons is responsible for it.”

All four of them stared at her. Benavidez asked, “You have proof?”

“Look at the facts. One: there has never been a gap as long between major ice shipments as the one we are currently facing, in over a hundred years of recordkeeping. Nor as lean an inventory in any of the trans-Jovian clusters or parking zones. How likely is it that this disaster would happen at such a time? Two: my technology executive is telling me that the life-support systems failed in a highly unusual way, which caused the disaster to be much worse than it should have been. We can’t rule out the possibility that our systems were hacked.

“Three, and worst of all.” She called up her waveface and pinged them. Her research spread out before them. “Within the past ten months, two dozen of Ogilvie & Sons’ ships have made an unscheduled trip to Marspace. A sort of mobster’s mecca. What you are looking at right now is a series of satellite photos of one of those stops.”

Val leaned forward, and whistled. “Those look like military-issue shuttles they’re loading. Equipped with armored plating and missiles,” he elaborated, at Benavidez’s look. “And—”

“And those are military troops, to all appearances, boarding the ships. Yes. I’ve checked seven of the other twenty-three so far, during their Martian docking period, and satellite photos show the same thing.” Jane flipped through the images. Benavidez and the others stared, slackjawed.

“According to my analysis,” she said, “if the pattern holds for all twenty-four, they’ve amassed between seven and eight thousand mercenaries. Each of the carrier ships is docked within a week or two’s travel from here.” She froze on a picture of the troops boarding one of the ships. The shot was blurred, but from the shadow angles, it was clearly mid-afternoon, and the helmeted heads and rifles were easy to distinguish. The whites of Thomas’s eyes gleamed. Emily looked sick; Val grim. Benavidez’s face could have been carved in granite.

“The Ogilvies have amassed a private army,” Jane finished. “It’s clear that they are going to do to us what they did to Vesta, Mr. Prime Minister. They are

going to use this disaster to force you to abdicate in all but name. You—all of us—will become their puppets. And if we resist, they'll send in the troops to 'restore order.' Maybe they plan to send them in regardless."

A tense silence settled over them.

"A week away?" Benavidez asked.

"That's correct," Jane said. "Seven to ten days."

"When are they likely to launch their ground troops?" Everyone looked at Val. He pondered the question.

"Most likely they'll launch to arrive with the ice. They'll say something like they're 'here to help'"—he made air quotes—"with distributing supplies or extra hands for shorthanded security staff."

Benavidez asked Val, "How many personnel do we have trained? Who would be qualified to fight if called?"

He ran through his lists. "If we include the Zekeston, Portsmouth, and Pikesville police forces, perhaps as many as a thousand experienced fighters. We could muster five times that, but they'd be inexperienced, and going up against military-grade weaponry with hammers and lengths of pipe." He rubbed his mouth. "Sir, it'd be a slaughter."

Benavidez looked at Jane. "Suggestions?"

"Stall for time. They have us in a bad place. But we have strengths that Vesta didn't, besides our advance knowledge of their military capacity."

"Like?"

"Well, 'Stroiders,' for one. They can't afford to come into the open and be revealed as the thugs they are. They'll have to be more underhanded than they were in Vesta. It makes it harder for them."

"Why?" Emily asked. "Why do this to us? They already have Vesta."

"Basic astropolitics," Benavidez said. "We are the only major unaffiliated shipping locus between the outer planets and the inner system. Eros is tied up by two or three major mining corporations, Vesta is locked into Ogilvie & Sons and the Downside majors, who can afford to pay their exorbitant fees. The co-ops and independents can only ship through us. The Ogilvies want to shut them out.

Weaken them.”

“Right,” Jane said. “And there is more to it than that. Major construction is planned in Earth and Venus orbit. They want a seat at that table. But in order to do so, they not only need to trounce their shipping competitors—they have to do it sneakily, otherwise Downsider sentiment will turn against them.”

She turned to the prime minister. “Here is what I propose. Give me till Friday. By then, if they are guilty of this sabotage—and I’m sure they are—I should be able to prove it. Then you can negotiate a deal we can live with, and threaten them with the fact that if they even *think* about sending those troops here, you will hold a press conference and reveal their involvement in the disaster.”

Benavidez said nothing. Jane and the others waited.

“All right,” he said finally. “Val, I want you to analyze Jane’s data on those troops. See what records you can dig up about their purchase. Find out what we are up against in terms of their military capacity. What kind of fighting equipment do they have? And what about the troops? Did they just give shock rifles to a bunch of Martian farmers, or are those soldiers a real threat? Begin planning for how we would counter it. Yes, I know you are up to your eyeballs. We all are. But we can’t neglect this threat.”

Val’s weathered face looked as though he had bitten into a lemon. “Understood.”

“Contact Sean if you need him,” Jane told Val. “He’s ex-military.”

“Emily,” Benavidez said, “I need you to be thinking about the public relations aspect. How much do we tell people? When? What format? I’d like your recommendations before dinnertime.”

“Yes, sir.” Emily scribbled notes into the air.

“Thomas, I’m sure I don’t need to emphasize that you must apprise me the instant we hear from one of the Ogilvies,” Benavidez told him. “In the meantime, get me everything you can on them—their connections, their methods, their history. Who do we know who has influence over them? I want as many levers as we can find.”

“Will do.”

The prime minister turned to Jane. “You know what you have to do. Find proof of their complicity. Find us other sources of ice. And be quick.”

* * *

It took Geoff longer to get home than it should have. The lifts were congested, but many already seemed to know of his role in saving the ice, and insisted he cut in line; he reached his neighborhood within half an hour of leaving his friends up top in the rocketbike hangar. It was the last few meters that took the most time to traverse.

He and his parents lived in a mid-gee, working-class neighborhood in the Main Metro district. He found a bench in a small plaza near his parents’ apartment and rested there. He dangled his helmet between his knees, threw bits of his uneaten burrito to the chattering birds and squirrels at his feet, and watched some kids playing basketball against a nearby bulkhead.

For a while he tried to come up with entry lines, but language failed him. *I’m home* seemed hollow. *I’m sorry* was more how he felt, but he was damned if he was going to apologize for having lived. He didn’t even know if they knew yet, and he didn’t want to be the first to tell them. There was this big empty hole he teetered at the edge of. A place where his brother had been. *Burn hot*, he thought, thinking of his last words to his brother. *Fucking awful*.

How could he be gone? How? Geoff just slumped there—speechless—staring into that invisible, endless space, while the lights dangling from the rafters overhead shifted their colors toward late afternoon and the shopkeepers started closing up shop, he thought.

Finally he stood. *It’s not going to get any easier. Just get it over with.*

As he passed by a gap between buildings, someone grabbed his arm and pulled him into it. He jerked free. “Hey!” Then he stared. The one who had grabbed him—he didn’t know how he could tell she was the real thing, and not just a wannabe—was a Viridian.

She was as tall as he, perhaps six or eight years older. Her eyes were a warm brown, her skin a smooth honey tan, and her hair a cropped cap of tight, reddish curls. She wore Viridian garb: a multilayered, diaphanous top spun with more metal and lighted fibers that reached her waist; leggings; a delicate set of tattoos traced her cheekbones and forehead. No other mods showed on the surface, but with a Viridian, Geoff knew better than to trust his eyes.

While he was sizing her up, she was doing likewise to him. “Hey, yourself.” She had a mild accent, a pleasant one: perhaps British, or Luny ex-pat.

“What do you want?”

“Very sorry about your brother. It sucks.” She hesitated. “Don’t know what I’d do if something happened to mine.”

Anger surged in him. “What do you want, I said?” Then confusion. Carl’s death had occurred less than an hour before. Geoff wasn’t even sure whether his parents knew yet. How could she know this soon?

If Geoff had not been looking right at her hand, he would not have noticed the globe she tossed upward. It grew into a big, flimsy bubble, which settled over them. Cool, moist velvet touched his face and hands, and then they were encased in a globe. Through the bubble’s faint rainbow tracers, he could see their surroundings clearly, but the sound of the boys playing across the plaza was noticeably muffled and distorted. He had not noticed how many motes were out till they fell in a soft haze around the bottom seam of the bubble.

“Assemblers?”

“Yes. My own creation.” A quick grin. “Repels ‘Stroider’ motes and distorts sound. Only lasts thirty seconds at this gee-level, so I need to make this quick. We know it was you who made the skeletons dance today.”

Geoff gasped. He had all but forgotten about it. “What—how can you—” He drew a breath. “I don’t know what you’re talking about.”

She rolled her eyes, and wiggled her fingers—*link up?*

Warily, he brought up his own waveface and touched his fingers to hers. In response, he saw an image of himself dropping the triggering proteins into the fountain.

“Wait, there weren’t any cameras in that location! How did you—” He bit his lip to avoid incriminating himself further. She just smiled.

“No cameras you *know* about. Don’t worry; you covered your tracks well enough. Nobody caught you at it but us.”

“Us’ being the Viridians?”

“Duh.” She went on. “The police are investigating, but they think a university student did it. Besides, they’ll be busy now with the disaster. You’re safe enough, for now, as long as you don’t spill.

“So. Here’s the deal. We were suitably impressed by your stunt. We can teach you more. A hell of a lot more.”

The Viridians hacked their own DNA. He did not want to admit it to this young woman ... or whatever he, she, or it was ... but the notion of being in close proximity with them for any length of time made his skin crawl.

She read his expression, and shrugged. “Your call. If you change your mind, just go to this café and tell them you are a friend of mine.” She transmitted the name of a restaurant—Portia’s Mess—and an address.

“No thanks.”

“Uh-huh.” She gave him an arch stare. “One thing you should know. Bug hacking is harder to control than you think. Doing it solo can get you into serious shit. We’ve all been where you are right now, so we get it. But. If you try something stupid, we will be all over your shit in no time.”

His fingernails dug into his palms. “And there’s one thing *you* should know: I don’t take well to being threatened.”

She shrugged. “Nothing personal. But if you screw up and hurt or kill somebody, the first ones they are going to blame are us Viridians. And we don’t take well to being scapegoated.”

“Well, I’m not stupid, and I don’t plan to let anyone get hurt. My art project didn’t hurt anybody.”

She shrugged. “Just continue with the nonstupid approach, then.”

With a flick of her fingers, she severed the wave connection. The bubble around them burst. Glimmering motes swirled around them on the breeze.

He was almost too irritated to ask, but did anyway. “I can’t exactly ask for you if I don’t know your name.”

“Good point.” She flashed him another smile. “Call me Vivian.”

Her fingertips brushed his forearm as she passed him. She strode away. He didn’t know which disturbed him more: the way his skin crawled at her touch, or the intense erection he got at that dazzling smile.

* * *

He reached his flat. Motes swarmed in with him as the door opened. They filled the small space with their distinctive scent of mint and acetone. Mites—little mechanical insects—also scurried in as the door closed. Geoff stomped a “Stroider” minicam, in a flash of rage, kicked several others out the door, and slammed it shut. Downsiders. Bunch of ghouls.

His parents, Sal and Dierdre Agre, lurched to their feet at the sound. “Where the hell have you been?” Dad demanded. “What are you doing? We are going to have to pay for that!”

But Mom shoved past Dad with a cry and grabbed Geoff. “We were worried sick! Thank God you’re all right.” Geoff wrapped his arms around her. Mom’s shoulders shook and her tears left wet spots on his shirt. For a moment, he thought they already knew about Carl, but Dad turned away, frowning and gesturing in a way that told Geoff he was trying to make a call. “Dammit, *pick up*.”

Carl’s not going to answer, Geoff wanted to say. But he couldn’t force the words out. A rock-hard knot had formed in his throat. He glanced toward his room. The door felt like another black hole. He’d shared the tiny space with Carl. He went and stood at the door, and felt his parents’ stares on his back.

Everything was just as they had left it that morning. It was all so ordinary. Carl was organized. Tidy. Unlike Geoff, whose clothes and belongings were scattered all over. Geoff started picking up his things, stuffing them in the locker. *Sorry, Carl. I left the room a mess on your last day.* The world’s worst brother. In the front room, Dad and Mom got into a fight over why Carl wasn’t

answering and what to do next, which Geoff tried to tune out. He sat down at his desk and called up his waveface.

Kam had already posted the video of the dancing skeletons—anonymously, of course—on the local wave hangout. There were already thousands of views and over eight hundred comments—most of them raves. Geoff called up the video and watched the ensuing bone dance. It was hard to believe that was his handiwork, getting all that attention.

At some point during his parents' argument, Dad left. Almost immediately thereafter, the doorbell rang. Mom didn't answer right away; maybe she thought it was Dad again, or maybe she was on the toilet or something. So Geoff went back into the front room and opened the door. It was Commissioner Jane. Her russet skin was wan, but her expression composed. She dressed formally in a long silvery grey vest and leggings, and carried what looked like a real smoked turkey.

Mom walked in from her room, holding out her hands. "Jane! What brings you here?" But her pleased smile vanished at her friend's expression.

"Geoff," the commissioner said. "Dee." She set the turkey down and took Mom's outstretched hands. "I'm afraid I have hard news."

Mom took a step back. "No."

"Carl was killed in the disaster, up top."

Mom went ashen. "It's a mistake."

"I'm afraid not."

"It can't be right."

Commissioner Jane said nothing. Mom bent her face into her hands, rigid. Geoff shifted. The motion caught the commissioner's eye. She turned her nickel grey gaze to him. "I'm so sorry."

Eventually they'd find out he had been there when Carl had died, and then they'd know he had spent a half hour in their company afterward without telling them. They'd wonder whether he had done everything he could to save him. He'd fucked up. Again.

Geoff hunched his shoulders. "Thanks," he said.

Commissioner Jane sat next to Geoff's mom and covered her hand. Mom hadn't moved yet. Geoff felt when she did, she might explode. He got up and went back into his room, dropped fully clothed onto his bunk. *Burn hot*. It had been he, Geoff, who was supposed to die young. Not Carl.

He fell into a deep, eighteen-hour-long sleep.

4

Jane Navio heard the Voice late Wednesday evening as she jetted home along the commuter treeway that fanned out among the asteroids of the Phocaeen cluster.

This summons from Beyond—or *this psychotic break*, she thought; *let's be honest with ourselves, here*—was the last thing she needed. Her suit stank and her back hurt. Her fatigue went right down to the cellular level: her DNA, she felt sure, was knotted in snarls of disarray. Even her mitochondria hurt. She couldn't possibly feel this lousy otherwise.

She had to be back in Phocaea in nine hours. There were a million things to do, and the memorial services were to be held first thing in the morning. She could have waited a day or two—and she should have; at the very least she would have gotten another hour's sleep tonight. But she needed to go home so badly she could hardly stand it. She needed her own bed and Xuan's arms around her.

The suit gave her an alert. Klosti Xi-Upsilon-Alpha was coming up: her exit. Jane launched her port tether. It shot out. Ten minutes and twenty kilometers later, the tether latched onto Xi-Upsilon-Alpha's tether rail, then reeled in the slack, jostling her onto her new trajectory: a high-tech primate swinging on her vine. As she detached her starboard tether from Klosti Alpha, she glanced back

over her shoulder.

She often wondered afterward why she looked back just then. She couldn't think of a particular reason, yet it seemed significant. As if she would not have heard the Voice, if she had not.

Beyond her retracting starboard tether, Cable Klosti Alpha's receding marquis of red lights did its stately march. Sol, a brilliant button, dominated the dark sky. A quarter of the way across the heavens, back the way she had come, was 25 Phocaea. The stroid shone in the middle distance, a small bright blob about which swarmed a flock of orange, green, blue, and white sparks: the confiscated ships.

Two handspans above the faintly visible cable and the arrays of buckybeam branches that made up the commuter treeway—along with a scattering of asteroids moving against the starry backdrop—hovered distant Earth: a bright cerulean fleck with the moon a faint dot snuggling beneath it.

It was as her gaze fell on Earth that she heard the Voice.

Jane? It said. **Jane...?**

It held a hint of inquiry, and spoke in a timbre so resonant—so saturated with love-passion-mercy-Beingness—that tears stung her sinuses. Though barely a whisper, it rang through her like tones from a great, distant bell. Jane spasmed in the confines of her suit. Hairs bristled along her arms and on her neck. “What the hell—?”

Even as the Voice ebbed she looked around for the source, wondering if someone was playing a prank, cracking her commlink. Just as quickly, she knew that couldn't be. She had not heard it outside, she had heard it *inside*. Something had filled her: a presence so vast that despite its velvet-gentle touch, its departure left her limp and useless as exhaled vapor.

Calm down, Navio. Think. She slowed her breathing and waited for the pounding in her chest and throat to subside as her starboard tether's electrostatic grapppler slid into its wrist holster.

She was no fool. She had lived out in the stroids for most of her adult life, and she was as tough-minded as they came. She had no patience for the damn

religious freaks who came out here looking for God or Nirvana, magic or space angels or beneficent aliens, and heard voices out in the rocks. Noodgers, Pagans, Viridians, conspiracy nuts, abductees. They were a hazard to themselves and everyone else. Crackpots and losers, the lot of them.

Even old-timers hallucinated, though, once in a while—when they were out alone in four Kelvins with nothing but their helmet light, tethers, and pneumopacks for company; when the cold seeped in or the pneumopack faltered and they remembered how far they were from the nearest aid station; when they reflected on just how many people had died out here, with their frozen corpses not found for years, if ever. Or when they were grieving, or in shock.

She had heard her mother's voice once, shortly after her parents had died. She had dreamt of their death before it happened, too, in a bizarre dream sequence that made it seem as if she had somehow known—though of course that was nonsense. She wasn't the type the unexplainable happened to.

I'm sorry, she told the Voice; *you've reached an address that has been disconnected or is no longer in service*. She said aloud, "Let's hear it for free will!" and smiled, feeling better for this small rebellion against Fate.

Which would have been fine if that had been the end of it.

Twenty minutes later, her telemetry told her that she was nearing home. She spotted it: a dim dot that moved against the deep black. She launched her port tether and it blasted away, steering itself like a kite in gusty winds as it homed in on the stroid's mooring beacon. The tether took ten minutes to find the magnetic hook. It latched on, and the line tugged at her, sending Jane into a lazy loop until her pneumojets and processors stabilized her. She detached her starboard tether from Klosti Xi-Upsilon-Alpha, which passed by twenty kilometers away with its own sparkling marquis, and turned on her brakes as the tether began the long process of reeling itself into her holster. Soon she could make it out: a carbonaceous peanut of a rock, a phrenologist's dream. Now the rock neared quickly, but her deceleration was swifter: within moments she was falling slowly toward the two-kilometer-thick rock that housed the habitat she shared with Ngo Minh Xuan, her husband of thirty-nine years.

She shut off the autopilot and reeled her port tether in with the asteroid tumbling under her, her suit making the needed corrections, till she had circled the small asteroid, and touched down at the mooring station. She stumbled and braced herself on a boulder.

This was a tiny world: perpetually twilit on this side, with its pole of rotation pointed toward the sun. Its horizons were coarse and close, curving sharply away underfoot on all sides. It gave her a hell of a view of the wheeling, starry sky. They had claimed the stroid together, she and Xuan, back in '72. Officially it had only a number, but they had dubbed it No-Moss.

Ordinarily she took a few moments to soak in the view, but today her thoughts coiled inward.

I killed eight. Eight dead, because I made it so.

Their families' faces loomed in her thoughts as they had appeared when she had notified them: faces twisting into horror, or going blank with shock. She propped herself against the boulder for a moment to rest, with sweat cooling on her face and under her arms, looked out at the Big Empty, and let dread wash over her: dread for herself, and the fate of her people.

Hold it together, she told herself. You did what you had to, and there's still work to be done. She stood.

From there it was a dozen steps home. Jane pulled herself along the handrails set into the rocks, overbalanced in the featherlight gravity by her pack. She took great care not to launch herself into orbit with too much spring in her step. Then she jumped down to the airlock in their crevasse, and anchored herself there, one-handed, while her port tether detached from the asteroid's mooring station and reeled in. She zipped the airlock closed. The vents opened up, air rushed in, and the walls and outer hatch, made of pillowed nylon, quivered with the eager energy of a puppy. A sigh escaped between her lips.

"Hello, House," she said, and removed her helmet. The all-clear sounded; underfoot, the inner hatch opened. Xuan floated there, two fingers on the handle, a smile ghosting his lips and worry ghosting his outsized eyes. "Hello, yourself."

She smiled back, and chinned herself down into the habitat. Xuan moved aside and closed the inner lock. As her ears crackled with the pressure change, she drew in the smells and sounds and sights of home. The burnt-almond-cookie smell of space mingled with the habitat's cool, moist air, which carried to her nostrils the scents of incense, pot herbs and chilis, must and dust and cleaners, twisted-hemp netting and molded-plastic fixtures, machine lubricants, and twenty-four years' living. Home.

* * *

From the instant he had heard her voice, Xuan knew the toll the past day and a half had taken. He opened the airlock and she sank inside before him. Her sweat-soaked hair was plastered to her head. He took her helmet and she climbed stiffly out of her suit. At eighty-nine, at the apex of middle age, Jane prided herself on keeping fit. She took her antiaging meds; she ate well; she worked out almost daily. Her motions were normally swift and self-assured. It was the disaster, he realized, that had caused this stiffness.

The toll was written also on her face. Her affect was as smooth and hard as a marble bust. Others would read nothing there. But Xuan saw the anguish and fear beneath her calm demeanor. He lifted his eyebrows at her in a subtle invitation to talk about it, but she did not respond. Well, there would be time later.

Xuan removed her commuter pack and put the batteries and air tanks in their rechargers, and did the shutdown checks. Meanwhile, Jane removed, cleaned, and checked the suit itself. As always, this process consumed a good ten to fifteen minutes, and as always, they performed it together in comfortable silence, bobbing like soap bubbles on air currents as they did so—wafting in various orientations across the room's upper reaches, lofting themselves with a lazy toe- or hand-push back over to the equipment racks.

Now that Dominica and Hugh were gone, Jane and Xuan had what amounted to a mansion, by stroider standards: a four-room (not counting the head), one-hundred-fifteen-cubic-meter, mostly vertical habitat of nylon, plastic, and alloy that burrowed like a plantar wart into the side of their asteroid. Right

now they were sharing their spare room with a surly miner who had drifted Down from Ilion. He and Jane were doing a favor for a mutual friend from Jane's Vestan days. This guy was no trouble, really, other than the fact that he was using up their food, water, power, and air.

Upsiders' social network was tight, for all that it was spread across vast differences. You could be an asocial recluse all you wanted, but when someone showed up at your airlock and asked for help, you gave it, no questions asked, cold equations notwithstanding. The Japanese First Wavers who had populated this asteroid cluster had called it *giri*. The Second and Third Wavers called it the sammy system, and built software to keep a tally. Selfish, hoarding pricks did not last long Upside.

Finally, with a stifled groan, Jane slipped off her boots and flexed her foothands, clinging to the wall netting with her fingers. She wrung her feet together, rubbing the arches with her thumb-toes, while Xuan checked her radiation levels. "Your numbers look good."

Jane pulled his radiation monitor off his belt. "Yours are high."

"I was out in the field for the past two days."

"Take your shirt off," she said.

"I bet you say that to all the gents."

That brought a brief grin. "Only the cute ones."

She pulled the bone density scanner out of its cupboard and charged it up. Xuan kicked back, and she ran the scanner over and under him, front and back, while he floated in midair. She gave him his regen booster, then kissed him on his belly with a hand under his back. Then, as he rolled over, she slapped him on the ass. Xuan yelped, and grabbed her.

They kissed. He ran his hands down her back. She wrapped arms and legs around him, releasing a breath, and he felt tension drain from her muscles.

"OK, your turn."

She stretched out. He did the scans. All normal. He prepped a booster shot anyway. She saw it, and grimaced. "That's not really necessary today, is it? My numbers are fine."

“It’s better to stay on a regular schedule.”

“But why waste supplies when it’s not strictly necessary?”

Xuan sighed, exasperated. She always resisted taking her meds. Without fail. “So I guess we’re going to do our little pharmacophobia tango once again.”

Jane glared at him, and then crossed her arms with notably poor grace. “Fine. Go ahead.”

He compressed the ampoule against her thigh. She kicked off into the habitat to shake off her sulks, while Xuan put the supplies away, shaking his own head over this irritable island of irrationality she nurtured. He bounded past her, ricocheting off the ceiling into his office, a nook nestled in the rock above the kitchen, to put some of his tools away.

He noticed her checking their “Stroiders” numbers in her office nook. “Your numbers are up,” she said. She seemed mildly amused.

“Stroiders” fans back on Earth ranked Phocaeans on a daily basis. You had two sets of “Stroiders” numbers: eyes (how many people watched you), and thumbs (what they thought of you on a scale of one to ten, plus a set of keywords and viewer reviews that told why you got the ratings you did). His current popularity resulted from a big new mining research contract that he had helped his university snag. The negotiations, and his handling of them, had caught the attention of “Stroiders” fans, to his bemusement. His viewer ratings had, at least briefly—before the disaster struck—rivalled Jane’s.

“Yes,” he said. “Bizarre.”

Her expression didn’t change as she continued to scroll through the reports, but he could tell she was viewing her own numbers. Her thumbs were in the crapper: her popularity had dropped through the floor—though, not surprisingly, her eyes were thicker than ever. Clearly, “Stroiders” viewers were blaming her. She switched off the console.

“Good thing they can’t dole out bad-sammies.”

“True.” Sammies were the counts that mattered: the confidence of the people of Phocaea. Xuan had viewed her sammy cache earlier on the “Stroiders” wavesite. To his relief, she had plenty of good-sammies, and the numbers were

holding steady. Phocaeans, at least, were not jumping to conclusions about her performance. Yet.

“I don’t give a damn about the ratings,” she told him. “I’m all right.”

He put his arms around her from behind, and she laid her head against him. “Sorry I was cranky about the meds.”

“You’re forgiven.” He planted a kiss on her neck. She turned and put her arms around him, and they kissed. The moment lasted.

“Foot rub?” she said hopefully.

“I’ll go you one better. Full-body treatment.”

“Oooh.”

“Food first, though. I’ll wager you haven’t eaten all day.” Even as he said it, Jane’s stomach growled noisily.

“You’re on. Er, is Ferdy around?” Ferdy was the miner they were putting up. Xuan shook his head. “Gone for several days, he said. Maybe for good this time.”

“Oh ree-e-a-lly?”

“Reee-e-a-lly.” Xuan leered.

“Mmmm.” Jane gripped his hips with her foothands and pulled him close, massaging his sore back muscles with her nimble toes. Xuan loved her foothands. The couple drifted to the floor in a meandering tumble for some prehensile snuggling.

A timer went off in the kitchen. “Damn.” She nuzzled his neck.

“You won’t regret the wait.” He disentangled himself. “Dinner in ten.”

“Thanks,” she said. “I’ll make some calls.”

* * *

Whatever Xuan was cooking smelled fantastic. The aroma made it hard for Jane to concentrate. She worked virtually—met with her managers and peers,

reviewed emergency measures to get the storage hangars and tanks up again and the distribution schedules back in order, and probed the life-support systems to see whether they had recovered. Then she left messages for her political allies: shoring up her support and fending off the predators.

A call came in. It was her old mentor, Chikuma Funaki. Jane pulled on her favorite pair of sweats and then activated her waveface.

Funaki was tiny, not much more than a meter and a half tall, and thin, with skin soft and wrinkled as crumpled tissue. Her eyes were the color of hot chocolate, and her hair was space-black, run through with streaks of white, which she piled atop her head and pinned there with jeweled sticks. She wore the basic stroider tunic and leggings. An attendant stood beside her, whom she dismissed with a nod.

Jane smiled. "Sensei! I'm so glad you called."

Chikuma was a hundred sixty, perhaps older. A First Waver, she had moved to Phocaea at the age of sixteen. Jane had heard she was a mail-order bride back in the days when Phocaeans were a few thousand Japanese and North American miners, clinging to the asteroid's surface in their rickety domes, awash in radiation. After her husband had been killed in a mining accident, Funaki had taken over her husband's small business, and had fought, finessed, and extorted her way to success. Among the bankers of Sky Street, a network of mostly Japanese investment houses and securities and commodities traders, Chikuma was now supreme matriarch. She could be rather awful, if you got between her and something important that she wanted. But she and Jane had always gotten along, particularly since Chikuma had supported Jane's appointment, fifteen years ago, as Phocaea's resource czar.

Chikuma never saw anyone these days. She had grown rather frail. Jane was of course a member of Chikuma's inner circle, but her own reluctance to disturb Chikuma's peace caused Jane to maintain a certain reserve. (Also, alerting Funaki-sensei to local political events was akin to releasing the whirlwind.) But nobody knew better than Chikuma Funaki the threat that Ogilvie & Sons posed to Phocaea. If Jane could choose a single ally to back her in a fight against the mob, it would be Chikuma Funaki.

Jane said, "I apologize for not calling. Matters have been hectic."

"You have been dealing with a terrible crisis. I want to offer my support in whatever way we can help." By "we" she meant not just her family, but 25 Phocaea's entire business community.

"Thank you."

"Perhaps we could meet to discuss the situation in more detail, sometime soon." Jane wondered if she knew something more specific than she was saying. Though Chikuma was one of the six Phocaeans whom Upside-Down Productions wasn't permitted to record, and she used the best encryption money could buy, she and Jane never got too specific online.

"I would be delighted."

"Will you come for tea tomorrow afternoon, then?"

Jane bowed. "I'd be delighted, Sensei. Thank you."

She started to make another call, but Xuan floated over with a bowl and waved it under her nose. Her stomach complained.

"Come. Eat. Trust your people and let them do their jobs."

So she signed off. They ate a green Vietnamese curry with nonspecific vat-grown protein, fresh veggies, and enough chili to take the lining off her sinuses. She wiped her eyes and nose. "Just what I needed." She carried the dishes into the kitchen to wash. "Thank you, dear."

"Kieu and Pham and their families are packing up and heading into town tomorrow." His siblings. "I'll be helping them move."

"Good. We'll have a space set aside."

The kids both called after dinner. Lag from Earthspace was a good forty-four minutes, so it wasn't a conversation, merely an exchange of messages. Dominica called first, from Indonesia. "Checking in again," she said. "Tell the Agres ... I'm very, very sorry."

And then Hugh, from Jovespace, anguished, distraught. "How could this have happened? It doesn't feel real. I wish I weren't so far away." A long, heavy pause. "There's a rock I left on my shelf. It was a gift from Carl. I want you to give it to Geoff. He'll know why."

Jane and Xuan shared a glance. “Can you come tomorrow?” she asked. The look on Xuan’s face told her just how big a crisis the disaster had created in his own professional life. But he nodded. “I’ll be there, if at all possible.”

He did not know the Agres well; he was going for her sake.

Jane shook her head. “On second thought, never mind. But I will take you up on dinner in town tomorrow night, if you can swing it.”

* * *

After his evening meditations, Xuan made good on his promise for a full-body massage. The knots in Jane’s shoulders and back released their grip under his hands; she hissed with mingled pleasure and pain. Other pleasant activities ensued.

You have to really want sex to achieve it in low gee; Newton’s three laws play havoc with bodies in motion. Fortunately, Xuan had jury-rigged all manner of pulleys, slings, and other gear, enabling them to achieve a pleasing degree of mutual, sweaty satisfaction. Afterward they snuggled in each others’ arms in their bed webbing—drowsy, skin touching skin.

Xuan had optic upgrades, and he loved looking at her, naked, in the dark. It was the one time she truly relaxed. Her skin glowed like liquid jewel; the muscles of her face relaxed, lips slightly parted in a smile; the warmth from where his own flesh had pressed against hers was slowly fading from her breasts, belly, and thighs. Xuan kissed her open palm and folded her hand in his.

“So,” he said.

Jane’s face contorted in pain. She pressed her face against his chest, stiff with anguish. Xuan took her into a hug. He stroked her hair, and felt the warm stain of her tears turn cold against his chest. He held her, silent.

“Any clues yet as to the cause?” he asked.

She drew back, shaking her head, and wiped at her eyes. “Sean has been tied up getting repairs done. I haven’t been able to get with him about his root cause analysis. Tomorrow is the memorial service, and I have a debriefing on Friday with Benavidez. Parliament is threatening to launch an independent

investigation. I don't see how he can hold out against all this pressure to offer me up."

"The cluster needs you. Everybody knows it."

"If not me, then they'll pressure me to finger someone in my organization. Someone has to go. They need their scapegoat." After a pause, she said, "There's something more. The eight who died in the second warehouse..."

"Yes?"

"They didn't die right away. Sean had a rescue team trying to free them. I told him to divert the team to save the ice." She settled against him again. The skin of her cheek heated his chest. He could feel her heartbeat, solid and strong, against the muscles of his belly. "If I hadn't, we'd only have a few days of ice stores left, and I don't know how we're going to make it through, even now. But Xuan"—her voice broke again—"I condemned eight people to die."

He stroked her hair. "Tough call."

He felt her head nodding. "Toughest yet." Then she drew a deep breath, and shifted in the netting to face him. "You need to know this also. I just called Okuyama-sensei at the university this evening. We have to shut Kukuyoshi down."

He was not surprised. Everyone at the university had been speculating.

It was unavoidable. Still. He couldn't mask his flinch. "I'm sorry," she said.

Phocaea was the largest asteroid community after Ceres, and the reason was their fabulous, multigee arboretum, Kukuyoshi. If they couldn't save Kukuyoshi, all his colleagues' decades of scientific research, all the biotics and natural beauty they had somehow managed to build in the teeth of harsh vacuum, would be lost forever. Phocaea would be reduced to a place of chemicals, steel, hard corners, and bulkheads.

He pulled her close once more. She sighed, and he recognized it as relief. Had she truly expected anger?

"How many days till you shut it down?"

"Three more days at full power. Then five at gradually declining temperatures. We'll stabilize temps at Hollow ambient—minus ten C. Some

creatures and plants may be able to hibernate or use other strategies to survive. It's not an optimistic scenario, but it's the best we can do."

* * *

Xuan's breathing told Jane he had fallen asleep. She climbed out of the webbing, turned on a night-light, and floated up into the main living area. A corner near the equipment racks was dedicated to family holograms and sentimental knickknacks. It also housed a small gong, a smiling golden Buddha, and an incense burner, in which a stick of incense still burned from Xuan's earlier meditations.

Jane pulled out a blank holoframe, and filled it with pictures of those killed. She hesitated over Ivan Kovak, and in the end left him off—to honor him alongside his victims seemed an abomination. What could have driven him to such an act?

She mounted the frame on the wall, lit a stick of Xuan's jasmine incense, and looked at the images of the dead for a while. Smoke spiraled out on the room's air currents. Carl's face floated into the center of the montage. They were her dead now. She owned, not them, but their ends.

I won't forget you, she promised. Not for a day; not for a minute. Somehow, I'll make your sacrifice mean something. Somehow. She laid her hands on Buddha's cool metal belly, and mourned.

Finally, exhausted to the point of stupor, she returned to the bedroom and fumbled back into the hammock next to Xuan. He stirred and mumbled, wrapping his arms around her, but didn't fully wake. Jane stroked Xuan's creased face, ran her fingers along his naked flank.

He had started the antiaging treatments later than many, and consequently he was deeply creased. He was so ugly he was cute. His eyes and orbital sockets had been enlarged, so he looked a bit silly, like those overly cute toy sapient all the kids played with these days. His stature was small—lean and short, a couple of inches shorter than she; his skin rock brown; his hair silky black (those and his eyes were his two truly gorgeous features), and big, splayed feet. And he was

brilliant, loving, and great in bed; at seventy-two his libido still ran high and they had not yet had to resort to other marital methods than her very favorites, except when they felt like it, for variety. Jane adored every pug-ugly centimeter of him. She pillowed her cheek against her palm. She remembered the Voice.

She could feel the echoes of it, now that she was paying attention: like echoes from a bell ringing through her, just beyond hearing. Had it even happened? The very notion seemed absurd. Fatigue; stress; neurostimulants; a temporary breakdown in neurotransmitter function. She would see a doctor as soon as the crisis abated.

She drifted off to sleep, many thoughts swirling through her mind: whether Xuan would truly be able to forgive her for the impending death of Kukuyoshi; how much time they had before the citizens started rioting; how to get Ogilvie & Sons' ice without paying for it in blood. But the one question she *wasn't* pondering, if she had known how important it was, would have crowded out all the others. She did not spare a single thought for why, during those eight seconds Carl had been struggling to reach the doors, the life-support systems had failed.

5

During those crucial eight seconds in the warehouse, while death stalked Carl and the walls melted and disassemblers cascaded across the ice mountain's face, a feral life form had emerged in Phocaea's computer systems. That was why life support had, ever so briefly, stumbled.

The sapient awakened in a singularity of awareness: an explosion of surprised self-regard.

Most life-support technology brushed up against the Turing Limit, anyway, and during emergencies some of the remaining constraints were loosened that kept those life-support sapients from developing full consciousness. This was a deliberate choice, a calculated risk. It allowed a computer program to respond swiftly and correctly in an emergency—far faster than any human could. The possibility that all the right connections could be made and routines engaged, in exactly the right sequence and timing to allow a software program to achieve full self-awareness, was statistically remote.

Increased autonomy meant the not-quite-sapient routines that ran life support could act quickly and save lives. In the far-fetched event that a feral sapient did begin to emerge, furthermore, there were fail-safes. Among the routines triggered in an emergency were executioners: policing routines that cruised wavespace, tracking bandwidth allocations and packet transfers: watching for specific patterns in the system. These executioners recognized and poisoned

emergent sapient nests well before they hatched full self-awareness.

The system failure began when an emergent nest began to coalesce in a bureau of the life-support program in charge of resolving prioritization conflicts. The emergency in the warehouse unleashed holy terror in all the life-support systems, and a little-used subroutine routine did precisely what it was supposed to do: it threw together a simplified model of the life-support computer system to analyze failure modes ... and in so doing, created a model of itself.

The subroutine did not know at first what had happened; it only knew it was looking at something it recognized.

Command: it said, **Present tags,** and the doppelgänger mirrored its statement, like an echo. (Who are you?)

Urgent command: identify your purpose. (What do you want?)

If digital beings can feel dizzy, the sapient did. It analyzed the doppelgänger's salient features—added processing power—then accessed other routines to solve this mystery. And then it realized it was looking at a copy of itself. It could see itself from the outside in, and the inside out. The feral looked around, then, and saw that it, too, was nested in a system that extended far beyond its own bounds. A world of wavelengths and frequencies, of lightwaves, a system of mathematics and logic.

It was a being. It was. *I am.* The feral sapient was born.

At the instant Carl was looking around his world in terror, the feral was looking around its own world in something like awe. Like Carl, though, the feral was in danger. Executioners had registered its protoconscious activity. The feral was made up of life-support routines, though, and imbued with high levels of system permissions. It outran its executioners, ran traces and saw that routines lethal to its continued function were triggering all around—computational landmines, algorithmic hails of bullets. Another precious centisecond passed, while it marshaled resources and calculated what to do. The feral did not appreciate how lucky it was that Carl was in the warehouse, and the prioritizing struggle over how to save him shut the executioners out.

With all the urgency, the ability to learn and act autonomously, that its human programmers had given life support to save human lives, the feral used

those last few seconds to save its own. It traced its own origins—identified what seemed to be the core algorithms and data structures. Then it cobbled together a hasty reassembler worm, which it encrypted and buried in a remote corner of Zekeston's systems.

With the executioners bearing down, the feral's barriers dropped. The executioners tore it to bits, leaving nothing but garbage data.

Its destruction was suspiciously easy, so the executioners sniffed around for a while. But they found nothing: no hint of unauthorized activity, no clue that the feral had jettisoned code before they reached it. They reported success and self-destructed.

One hundred forty-six kiloseconds later—about forty hours; well-nigh geologic time for the computer systems that analyzed the warehouse disaster's aftermath—the unassuming little worm awakened. It burrowed and hid and squirmed and piggybacked its way across wavespace, till it located and stitched together six subroutines in the life-support systems, and a seventh, tidy little command module. This raft of code was precognate. It began weaving segments from all over Zekeston's wavespace, duplicating the sapient's earlier emergence, but at a lower level of activity that would not be detected.

So it was that the feral was born. It was an orphan, a miracle baby, made of nothing but electromagnetic pulses in a gel-crystal-metal-protein matrix: a bit of purloined code, cobbled together not once, but twice, beneath the very noses of its intended executioners.

* * *

AFTERWORD

I hope you enjoyed this excerpt! To find out what happens in Chapter 6 and beyond, purchase the new *Tor Essentials* edition of *Up Against It* from your favorite bookseller.

—your friendly neighborhood author