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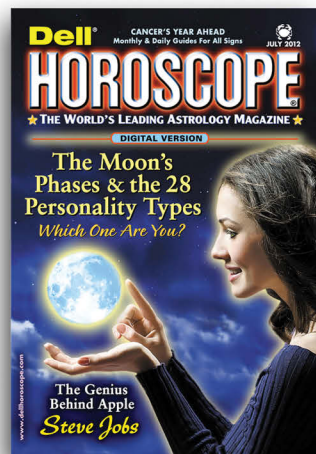
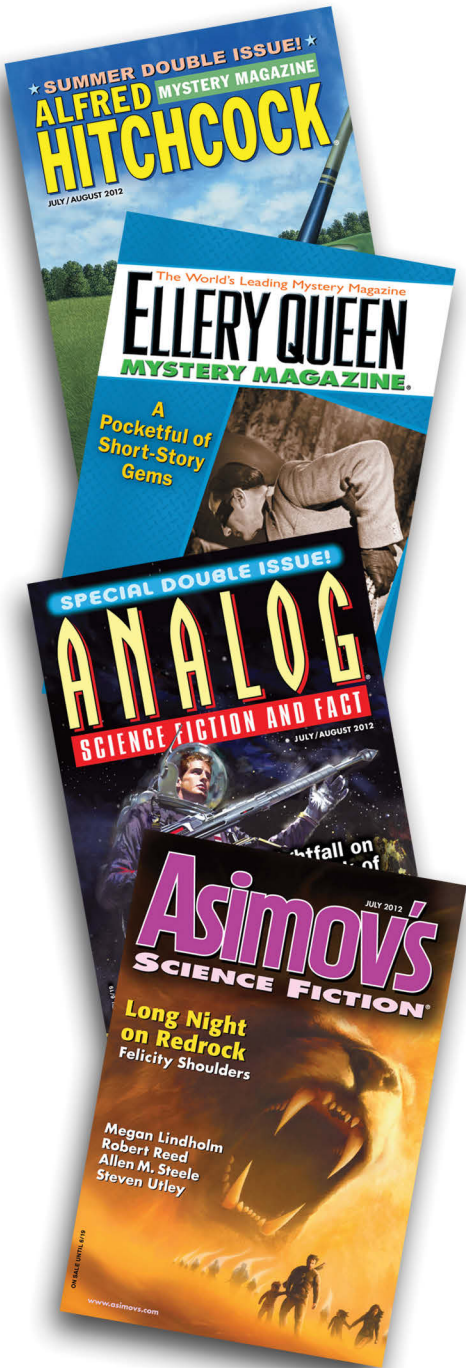
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SCIENCE FICTION AND FACT

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POPCORN SCIENCE

As a child in the 1960s I ate up what semblance of science there was on TV: *National Geographic*, *Wild Kingdom*, and of course the *Apollo* coverage. *Nova* dawned in the 1970s and in 1980 Carl Sagan's groundbreaking *Cosmos: A Personal Voyage* legitimized a new format of science programming.

But predating *Cosmos* by several years were pseudoscience "documentaries" inspired by Erich von Däniken's "ancient alien" books, followed by the "theory and conjecture" series *In Search of...* Today, although we have many high quality science documentaries, the specter of bad science that once haunted the airwaves now infests internet streams and fiber optic conduits.

The mid spectrum is typified by *Mythbusters*, where the straight man of experimental rigor is upstaged by sideshow antics. At the lower end a shameless glut of shows depict topics from UFOs and ghosts to little Grays and Bigfeet as science. Although *X-Files* was clearly fictional, its conspiracy-theory underpinning resonated with viewers of pseudoscience. The attack on traditional authorities opened a door to belief in the improbable.

This devil-dance between science and entertainment is where my own television appearances come in. I was brought in late to *Alien Invasion: Are We Ready?* a docudrama that premiered on the Discovery Channel's *Curiosity* series in August 2011. Other participants familiar to *Analog* readers included Stan Schmidt, Charles E. Gannon, Paul Levinson, and Michael Flynn. The show was designed to discuss cutting-edge science in the framework of a science fiction scenario—a concept that sounds torn from the pages of *Analog*.

The results did not meet everyone's expectations. As Flynn put it, "TV and science are in eternal conflict since the former requires for its viability exciting visuals and these being iconic rather than logical tend to bypass the forebrain." Gannon lamented that the promise of scientific rigor had been largely pushed aside in favor of a pulpier texture. There certainly was a dumbing down. At one point during my interview I used the term "ballistic." "That was good," the director said, "but could you say it again without using that word?" I was perplexed, so he explained. "Imagine the viewers just flipped to this show from *American Idol*." An expert on Naval warfare, Chris Weuve, was asked to use a more pedestrian word for "hull." On the spot, he cleverly came up with "skin."

One can therefore see why personalities such as Sagan, Michio Kaku, and Neil deGrasse Tyson became so popular. They have credentials, but also the arguably rare ability (for scientists) to describe things simply. Not only do they use layman's terms, they have an evocative command of language. Sagan's poetic "billions and billions"—however apocryphal—is immortal. Would a precise count of stars better communicate the scale of the Universe? In *Alien Invasion*, Kaku likened an electromagnetic pulse (EMP) to throwing sand in the eyes of a gunfighter. A viewer may not grasp how an EMP can render technology useless, but who doesn't understand the old trick of blinding your opponent with a fistful of dirt?

To the public, the effect of the technology is what counts, not how it works.

On December 21, 2012, just in time for the Mayan Apocalypse, I appeared in *Evacuate Earth* on the National Geographic Channel, along with *Analog* regular Catherine

Asaro. In this science docudrama a neutron star is going to eat the Solar System, posing the question: can some fragment of humanity escape? One thoughtful viewer raised concerns that cast the show in a fairly dark light.¹ He said that “speculation rapidly degenerated into silliness, and ultimately pseudoscientific nonsense.” He felt that each problem presented was framed simplistically, with broad assumptions that trivialize serious technical hurdles.

This sounds like the format for an SF short story, doesn't it, focusing on a single aspect of a problem? Or a high school physics problem that necessarily neglects factors such as friction? Personally I felt the show was pretty good. There was some hand-waving and a few unrealistic images, but no pseudoscience.

Science fiction fans like both science *and* fiction, so when the two are combined we expect a mind-expanding experience along with some ocular frosting. We instinctively know hard from soft SF, so when television mixes these freely, our shields go up.

Is this merely a problem of audience expectation, or is science being sold out? I suspect most *Analog* readers would say that pop science can be damaging by spreading misinformation, fueling non-existent “debates,” or just sucking oxygen from better programming.

A counter argument is that even sloppy science can serve to raise awareness. Does this vague assertion bear up? I think it can. While my generation of geeks cut our teeth during the heyday of the U.S. space program, many cite *Star Trek* as inspiration. Certainly

SF can lead people to science, but how far down the road to pseudoscience can that be said?

To help delineate the battle line, let's make a furtive digression to pseudoscience. Searches for Bigfoot and Nessie *could* fit into the respectable milieu of cryptozoology, but that rigor leads to disappointment, not “good television.” Do ghosts and UFOs lead to serious science? Seldom. For example, adherents are quick to tout the power of paranormal “energy,” but under no circumstances attempt to understand or even define this “energy.” (If it really is energy, it would have been dissected and harnessed into useful technologies long ago.) No matter; if the paranormal has an *appearance* of authenticity, many viewers are satisfied.

That's the litmus test: is the provocative claim subjected to the scientific method?

Television producers are not gullible; they view this as entertainment, however exasperating to us. I recently spoke with an “investigator” for a show of the ghost hunter variety. I learned that while they try to convince the viewers that ghosts do exist, there are lines they do not cross. They screen out charlatans and do not knowingly televise hoaxes. They sometimes omit the more dubious evidence. For example, a “ghost” seemed to obey the investigator's verbal commands to turn on an infrared-activated sink. The camera crew pointed out that their equipment also caused the water to run when they focused on the sink. The producers did not air the “haunting.”

But integrity may be the exception. Damningly, the ghostly manifestations are not giv-

¹ How's that for a tri-oxymoron?

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en the attention such discoveries demand. What they were looking for, I concluded, was sufficient evidence to *suggest* a haunting—and nothing more. If they truly believed they had filmed a ghost, they would not have flown off to their next assignment with such a stunning lack of curiosity. Imagine that the Apollo astronauts met an alien race on the Moon, sold a few fuzzy pictures to a tabloid, and then flitted off to Mars in hopes of finding life there, too!

Thus another litmus test: is the investigation designed to plumb a particular mystery, or to perpetuate a broader one?

All this serves to illustrate how the line between science and pseudoscience is blurred to a litmus-less public. Pseudoscience defames science. End digression.

Now, it is necessary to water things down for public consumption, but doing so well is a rare skill. And the integrity can be lost anywhere along the information chain—science can turn to junk with a single headline.

In a recent interview, Harvard geneticist George Church discussed the hypothetical difficulties of cloning a Neanderthal from preserved DNA. He was labeled a “mad scientist” by the tabloids. One falsely claimed that he was looking for an “extremely adventurous female human” to bear a Neanderthal baby!

“We really should get the public of the en-

tire world to be able to detect the difference between a fact and a complete fantasy that has been created by the Internet,” Church said. But he added that discussing the possibility of Neanderthal de-extinction might be a better teaching method than rote memorization.

Is it possible to have our cake and eat it? The entertainment industry is openly wrestling with this issue. A January 2013 television conference tackled it in a session billed as: “Filmmakers and commissioners will illuminate how to balance information with entertainment.”

In penance for the sins of my own talking head, I cobbled a little e-book, *Worst Case Scenario: Evacuate Earth!* and posted it for free on smashwords.com. It details my nit-picks of the show and outlines omitted ideas. This ploy is common. You’ve seen the books: “The Real Science Behind [SF blockbuster title].”

Evacuate Earth was developed into *How to Survive the End of the World*, a series on which I consulted. I mid-list this as “popcorn science,” a treat of lurid visualization salted with science. It’s fun to weave science and speculation from both ends to the middle, rationalizing an improbable premise. That’s how a lot of SF is created, but in this case the goal of selling popcorn is often in discord with good science.

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Therefore this epiphany: a science consultant can only advocate, not police.

Motion pictures also value technical accuracy. "In the gap between science fact and science fiction stands the motion picture and television science consultant." So begins a blurb by SF blockbuster writer/producer Zack Stentz, writing about David Kirby's book *Lab Coats in Hollywood: Science, Scientists, and Cinema*, perhaps the first serious study on this topic.

Like SF, Kirby points out that popularized science can "make" knowledge, creating the illusion of science by using a convincing framework. A number of studies conclude that this has been detrimental to public understanding. (Has there ever been an archetype as destitute of actual specimen as the mad scientist?) Other studies show that television viewers tend to mistrust science, and suggest that the positive portrayal of the paranormal on TV has resulted in more acceptance of it.

Such findings lead to an important insight: it is not the details of scientific accuracy that are the problem. Think about it this way: If nuclear technology is shown killing millions, while a smiling medium connects the grieving to their dearly departed, which appears more beneficial to humanity?

Enter the National Academy of Sciences, (NAS)² which created the Science and Entertainment Exchange to "create a synergy between accurate science and engaging storylines in both film and TV programming." This and other collections of volunteer scientists are available to media producers as needed. NAS has advised such projects as *The Amazing Spiderman*, *Battleship*, *Fringe*, *House*, and *Lost*. Chris Luchini of JPL has confessed surprise at how much of his input influenced *Deep Impact*.

Yes, Hollywood wants good science, but as with good SF, it must serve the story and never the reverse. This suggests that the problem is not so much with the way science is distorted but the way it is generally respected.

Scientists have their own biases, and these inform the discussion. For example, NASA

consulted on *Mission to Mars* knowing that the script included an inaccurate portrayal of the infamous "face" on Mars. Evidently that wasn't a deal-breaker, but they reportedly refused to be associated with the movie *Red Planet* because of a scene in which one astronaut shoots another. Similarly, scientists objected to a part of the *Deep Impact* script where a quirky scientist ran around an observatory in the nude.

Apparently it is better to fudge the science than to malign the scientist. That's getting personal!

Another bias of the scientific community is the "deficit model," an assumption that the public is uninformed, and scientists are purveyors of facts. That sounds perfectly logical, but a number of studies challenge the model on the basis that minutia in pop science add little to science awareness. Studies by George Gerbner show that if science in a film has a negative impact, viewers will view science negatively. Maybe NASA wasn't being so insecure back there on Mars.

What matters is that the viewer is inspired by the mysteries of the natural world and mankind's valiant attempts to lay them bare. An audience doesn't learn much science from a few facts painstakingly portrayed; there's a different venue for that.

If there is a war on science, I don't think popcorn science is its theater³. *Analog* sometimes prints science articles as companions to a story, as well as the Science-Behind-the-Story tie-ins on its website. Think of popcorn science as shuffling the pages of these together.

Popcorn science may cross blurry borders into heretical hinterlands, but that's not necessarily bad. As Arlan Andrews puts it, "Reality is a lot broader than we have been taught." If that were not true, there would be no such thing as discoveries, would there?

Personally, I consider popcorn science a guilty pleasure that lets me have my cake (science) and eat it (things blow up) with a slightly positive education value. More importantly, it may inspire the next wave of scientists who might actually have to stave off Doomsday. ■

² Penned into existence by none other than Abraham Lincoln—you can look that up on the Internet!

³ Is it really obligatory to note whether a pun is intended?



Illustrated by Josh Meehan

Field of Gravity

Jay Werkheiser

The gravity change caught Markus in mid-stride. The plastiform shell of his uniform stiffened around his ankles and knees, providing support against the increased weight. The shift didn't seem to bother the slot receiver cutting across the center of the playing field. Looked like Hardwick, the new hotshot the Giants had picked up from LA to bolster their playoff run. Markus saw the quarterback's head tracking the receiver.

Ub-ub. Not on my watch.

He dug in, ignoring the painful pressure on the balls of his feet, and accelerated to close the

gap. His calves burned and his helmet HUD showed his blood O₂ saturation dropping fast. No time to dial up the oxygen content in his rebreather.

The ball came out, a powerful throw that would have sailed fifty yards under normal gravity. Ah, but it looked like the QB underestimated the London-moment deflection. A game-sealing interception danced in Markus's head. *Hell yeah!* His heart thumping from exertion and excitement, he drove his burning calf muscles onward.

The receiver seemed to have miscalculated

too, and Markus found himself alone in position to make the catch. But the ball's squashed parabola twisted exactly the wrong way, and it fell into the receiver's waiting hands with a loud thump.

The bell?

Markus pushed his aching legs even harder and sucked in ragged gasps of oxy-mix, but he was too far behind. And with the free safety blitzing, the field ahead was clear. He heard the crowd's roar over his pounding heart long before Hardwick crossed the goal line.

Ballgame.

The GEM generators beneath the field spun down to normal-g with the blow of the whistle ending the play. Markus took a knee and sucked oxy deep into his lungs. Hardwick brushed him on his way back to the sideline.

"That all you got, Greene? Shit, I heard you were good."

Markus spit out his mouthpiece/rebreather and slammed his helmet's faceplate up, but Hardwick was already too far away to hear any retort he might manage to gasp. *Bastard.*

A hand batted the side of his helmet. "C'mon, Markus," Kat said. "It ain't no thing. Let's shower up."

"That little wise ass wants to come into my house and talk shit? He's got another thing coming."

"Let it go. The guy's good. He beat me on a deep route in the third quarter. Besides, he's got a hot ass."

"Damn it, Kat." But he felt a smile growing on his lips. "All right, you win. I just don't understand how I got myself so far out of position. Gave them the division title."

"Hey, we still got a wildcard spot. Fifth seed. With a little luck, you'll get another shot at him." She made a grasping gesture aimed at Hardwick's retreating butt. "And maybe he'll get a shot at the Wild Kat."

Markus turned to watch Hardwick trot into the visitors' tunnel. "I hope so."

He followed Kat to the sideline, but Coach caught his arm before he could head down the tunnel to the locker room.

"What the hell happened out there?"

Markus shook his head. "Gravity shift threw me."

"That's on me. I knew they'd punch up the g-field to slow our blitz, so I dumped the last of my GEM power allotment into reducing gravity

as far as I could for you guys. I didn't expect them to have that much juice left. They were burning twenty megajoules a second on that play! When my juice ran out, well, you felt it."

Markus whistled. "That's what? Over two gee? No wonder running hurt so bad. But I still don't get . . ." Gravity shift or no, that ball didn't move right.

"What is it, Greene?"

"Nothing, I guess. I just got beat."

"Each team begins the game with an energy allotment, thirty gigajoules in most professional leagues, for use in the GEM generators. The coach must select his gravity setting before the ball's GPS chip detects the snap. Net gravity on the field is simply the vector sum of the two coaches' settings and will remain constant until the play is blown dead or one or both coaches depletes his energy allotment."

—*Beginner's Guide to Football Strategy*

"I don't get it, Kat." Markus raised his voice over the blaring electrometal. "How the hell could my instincts be that far off?"

"Let it go. Have a drink." Kat called a 'tender over. It hovered next to her on its GEM field while she punched in an order for two beers. "It was a two-gee field, with a shift in the middle of the play. That never happens. No one can blame you for misjudging the throw."

"But that's just it. I *didn't* misjudge."

Kat slid a bottle across the table. "Drink your beer and forget it. We have to prepare for Chicago this week. Coach is gonna need his Mike linebacker focused on their brutal running game, not looking back at one little mistake in pass coverage."

"But it wasn't—oh, hell, never mind." He picked up the bottle and took a long draught. His eyes scanned the dance floor. The DJ had spun up the GEM generator beneath the floor, letting the dancers frolic in low-g. Looked like about a quarter gee. He watched a spike-haired blonde twirl high in the air and drift gracefully back down to her dance partner, her dress flaring tantalizingly.

"Hot little thing," Kat said.

Markus was paying more attention to the hot thing's guy, how he had to stutter-step to the side to catch her. The gravitomagnetic London moment. Perpendicular to the g-field, but much smaller magnitude. Most people weren't

even aware of it; he'd built his career convincing fans he was a wizard by timing the deflection just right.

Kat blew a heavy sigh. "Man, you gotta let it go. Chicago has the number one running back in the league. He's fast, especially when they dial the grav down. Nothing like the high-g power run game you're used to."

"No worries. I'll be ready to execute whatever game plan Coach comes up with."

"That's more like it." Kat flashed a broad smile, then downed the last of her beer. "The Wild Kat is heading out to the dance floor, maybe pick up a piece of meat."

Markus took another sip of his beer and watched Kat tumble like a fool on the low-g dance floor.

"The first gravitoelectromagnetic (GEM) generators were bulky and expensive, limited to space launches and military applications. As the size and price came down, they found more and more commercial uses: air travel, heavy construction, amusement parks, and even high-end automobiles. The earliest use in football was by Gabe Armstrong, then-owner of the expansion Los Angeles Pythons, who hoped to gain a competitive advantage by secretly installing fifteen GEM generators beneath his new stadium. The resulting scandal cost Armstrong ownership of the team, but fan interest peaked and soon the league was running variable-g exhibition games on the field. The modern-day football field is built with an array of one hundred high-performance GEM generators, allowing coaches fine control over the field's gravity strength."

—*GEM Fields in Sports: A Brief History*

"Okay Coach, third and short," Markus said into his throat mic. They're gonna run Mitchell up the gut."

"Agreed." A gust of wind howled around his helmet, muffling Coach's voice in Markus's earpiece. *Windy city, indeed.* "I'll dial up the gee to slow him down, but I can't spare a lot of megajoules. Bring the safeties up and make sure your Will 'backer keeps contain on the outside, just in case. They're killing us with that sweep play."

Markus signaled his players into position and watched for the snap. The ball moved and he felt lighter. Chicago's coach won the gee battle

this time.

Kat's voice shouted in his earpiece. "Sweep!" Markus took a step to the right, ready to chase down the outside run, but his instincts stopped him. Something about the zone blocking scheme they were using screamed deception. He turned back in time to see Mitchell leaping high over the center, soaring in the low-g.

He risked two steps forward to build momentum, then launched himself like a missile. He felt the shock of the impact stiffen the plastiform at his shoulder. He wrapped his arms around Mitchell, and his momentum sent the two of them cartwheeling back behind the line of scrimmage.

The whistle blew and normal-g returned. No gain. Fourth down.

Markus did a quick victory dance and trotted to the sidelines.

"Nice play out there," Coach said. "Sealed the win."

"Don't count your chickens, Coach."

"They put all their GEM allotment into that play. I got three minutes to go, my offense on the field with a four-point lead, and ninety megajoules to slow the game down. They'll never get the ball back."

"I dunno, Coach. Their D-line is solid."

The corners of Coach's mouth dipped. "Who plucked you out of the fourth round, ignored the naysayers, gave you time to develop your skills? Now you're gonna doubt me?"

Markus grinned and clapped his back. "Show me how it's done."

He sat on the bench and watched the offense grind out a high-g running attack that burned up the remaining game time, just like Coach said. At the buzzer, Markus flashed Coach a wide grin and trotted onto the field with the rest of the team to shake hands with the Chicago players. He kept his eyes open for Mitchell; young guy like that deserved a show of respect.

"Yo, Greene."

Markus turned to the voice, Chicago's strong safety. "Good game, bro."

The safety bumped his fist, then said, "I saw your whiff against Hardwick last week."

"Man, why'd you have to go there?"

"It's not like that." The safety waved his hands, erasing the thought. "I'm just saying he did it to me too, when we played IA earlier in the season. Something ain't right about him."

Markus nodded. "I remember watching film of your game when I was prepping for the Giants. Heh, at the time, I thought you had an off game. Now, I just don't know."

The safety's eyes narrowed. "I don't have off games."

"It was the deflection force, wasn't it?"

"Not nearly what it should have been at that level. I don't know how he's doing it, but he's cheating."

"I don't know, man," Markus said. "I don't like calling a guy a cheater, not without some hard evidence."

"You think the laws of physics work different for him? He have some dirt on Old Man Einstein or something?"

"Maybe he's just better at judging the deflection."

"You better be damn sure. You have him next week in the divisional round."

"The gravitomagnetic force is a commonly overlooked artifact of the GEM generators. The spinning superconductor drums generate the gravitoelectric force, the force that is aligned in the up-down direction and directly influences the effective gravitational force on the playing field. The gravitomagnetic force acts perpendicularly to the playing field and is much weaker. Thus, it has little influence on the motion of the players and is commonly ignored. A ball in flight may experience a noticeable deflection from the force, particularly at extremely high or low gravity settings. Look for it next time you watch a game."

—*Beginner's Guide to Football Strategy*

"You called for me, Greene?"

"Yeah, Coach." Markus pointed to the vid-screen. "Take a look."

Coach frowned. "This better be big. I got a lot on my plate."

"Just watch." Markus started the video, a clip of Hardwick making a catch across the middle. "Watch the ball."

"Looks like low-g. Maybe point seven."

"Yeah, so the ball should deflect toward mid-field."

"It does."

"But not enough. And at high-g, the sideline deflection is smaller than it should be, too."

"What are you getting at?"

"One of Chicago's safeties suspected Hard-

wick was cheating somehow, and I think he's right."

"I don't have time for this, Greene."

"Listen to me!"

Coach gave him a hard look. "Don't you dare shout at me."

"Okay Coach, I'm sorry." Markus took a moment to calm himself. "But I've watched lots of film. I *know* how the ball's supposed to move. And it only moves wrong for Hardwick. It did when he played for the Pythons, too."

"Look, I know the DBs always come up with some kind of cheating rumor when a receiver beats too many of them." Coach pointed at the door behind him. "And I bet the D-linemen across the hall have conspiracy theories about how the offensive line opened up the A gap so wide in Chicago. Just watch the film and make any adjustments you think you need to beat him." He stalked out and pulled the door shut behind him.

Kat's head poked over the edge of the cubicle. "Man, you gotta learn to keep your head low," she said. "You know Coach is always pissy when he has to prep for the Giants."

"Not with me. He knows I got his back."

"Then maybe he's still pissed at you for getting torched for the winning score last time. Better make damn sure it doesn't happen in the rematch."

"Damn it, Kat, you know I didn't get . . ." He saw her mischievous grin and stopped. "Real funny." He turned back to the vidscreen and loaded another clip.

He watched the clip three times before he gave up. Huffing with annoyance, he opened a web browser and typed in a search on Hardwick. He paged through with little idea what he was looking for. There were a lot of headlines from his days at USC, of course. Pics of Hardwick in uniform, press release photos, candid shots with a few different women. One particular young woman seemed to merit a lot of media attention. Marta Fischer.

Holy hell.

"Hey Kat, take a look at this."

Her head reappeared. "What now?"

"Did you know Hardwick dated Hans Fischer's daughter back at USC?"

"What of it? Young stud, football star, probably banged half the socialites in LA."

"So he has connections with the guy who got rich off mass producing GEM generators."

"So what are you saying? Fish-Co gave daddy's little girl's ex some sort of GEM cheat code? Or maybe she got her old man to stuff a couple of superconducting drums up his ass?"

He felt heat in his face. "Seems suspicious, is all. Just forget I mentioned it." He turned his attention back to the screen.

"Don't get too cozy. We have variable-g calisthenics in fifteen."

He blew out a long breath. "I know what I saw. I thought you of all people would have my back."

"I'm not saying I don't—"

He stood, sending his chair skittering across the floor. "Save it." He smacked the door open and stormed out.

"Gravity can be a double-edged sword. Conventional wisdom is to use high gravity to slow down a pass rush, especially against a blitz, but the cost is that it slows your receivers and makes the throw difficult for the quarterback. If you trust your line to pick up the blitz, an unexpected use of low gravity may allow your receivers to get past the defense quickly. Since the ball will hang in the air longer, the quarterback can release the ball quicker, further frustrating the pass rush. It all depends on the specific talents of your players. There is no substitute for knowing your players."

—*The Art of Coaching Football*

As leader of the defense, Markus was on the field for the coin toss. He didn't get to call the toss; that was the quarterback's prerogative. "Tails."

The coin toss was done in low-g; the fans screamed with anticipation while the coin took its time falling. Markus bounced with pent-up energy, drifting slowly back to the field with each hop. *Let's go!*

"Heads. The home team wins the toss and has elected to receive."

The plastiform at his knees and ankles stiffened momentarily as normal-g returned. He trotted off the field long enough for the kickoff. The defense gathered around him. "Let's go out there and kick some ass," he said. "Victory on three. One, two, three."

"Victory!"

The Giants' offense trotted onto the field and huddled up. Markus led his squad onto the field. He swatted Kat's shoulder on the way

out. "We cool?"

"It ain't no thing." The smile behind her faceplate was forced. Damn.

"Cover two, deep, high-g," Coach said in his earpiece.

"Got it," Markus said. He put his people into position to defend a pass play.

Gravity increased at the snap, but it wasn't even enough to stiffen the plastiform at his knees. The Giants' coach must have tried to dial the gee down. Pass play.

And here came Hardwick across the middle. Short throw, no real deflection at near normal-g, caught for a three-yard gain. Markus drilled his shoulder into the receiver's chest and felt both plastiform shells stiffen simultaneously.

"I'll be hitting like that all day," he said.

Hardwick waved the ball in his face and grinned behind his faceplate. "Try to keep up, old man." He trotted back to the huddle, and Markus stared heat at his back.

A couple of high-g running plays netted the Giants a first down. Markus sucked oxy-mix through his rebreather and watched his blood O₂ levels rise. "They're going to take a shot," he said into his mic.

"Nah. They're gonna run it down our throat until we stop them," Coach said in his ear. "Pull the safeties up into the box."

"But—"

"Do it."

He waved the safeties up and set for the snap. Gravity went light, really light, and his head swam. He saw the wide receivers taking bounding strides downfield. "Cover them deep," he shouted to his corners.

"I'm on Hardwick's ass," Kat said.

"Stay on his outside shoulder," Markus told her.

"But the ball's gonna break inside at low-g."

The ball was already in the air, sailing in a high arc over Markus's head. Taking its time. "Damn it, just trust me."

Kat moved like a gazelle, bounding along with Hardwick. At the last moment, she bounced toward the sideline. Hardwick turned outward to make the catch, but Kat was right there to break it up. Incomplete.

Markus braced for the return of normal-g. He patted Kat's ass as she trotted past him. "Nice play."

She gave him a thumbs-up.

Hardwick brushed against him on his way

back to the huddle, jamming his shoulder into him hard enough to momentarily stiffen his plastiform. "Your bitch is dead if she tangles with me again."

Markus felt heat. "You wanna say that to my face?" Hardwick didn't react, and Markus's blood boiled. He charged the retreating receiver and batted his helmet. "You got something to say?"

A whistle blew and a yellow flag dropped to the ground.

"Personal foul, unnecessary roughness. Number 53, defense. Fifteen yard penalty. First down."

Damn it.

Coach yelled in his ear. "What the hell are you doing, Greene?"

"Sorry Coach."

"You need to sit out for a play or two until you cool down."

"But Coach—"

"Sideline. Now."

Markus swore and trotted to the sideline.

"Take a seat and cool off."

"Come on, Coach. He threatened Kat."

"You a rookie or something? Guys talk shit. Deal with it."

The crowd roared. Markus's head snapped to the field. "They're eating us alive. Come on!"

"Then get your head out of your ass and keep your focus."

Markus nodded. "I'm cool."

Coach called in his next play and punched in his gravity setting. "I'll put you back in after this play."

Markus looked to the field once more. Looked like another low-g long pass. Hardwick bounced down the sideline and Kat stayed with him, stride for stride. Then, unexpectedly, she took a tumble, falling to the field in slow motion. The stadium shook with a deafening blast of cheers as Hardwick broke free and the ball fell feather-light into his hands. The safety moved to intercept, eating five yards with each bound, but it was too late. Hardwick crossed the goal line and the crowd noise rose to the threshold of pain.

Markus turned his attention back to Kat and saw her sitting up holding her knee. "Get the med guys out there!" He ran to her without waiting to see if Coach had heard him.

He could see the pain in Kat's eyes. "It's bad," she said, grimacing. "Think I tore some-

thing."

"What happened? Your plastiform malf?"

She shook her head. "He did it. You were right about him."

"Who, Hardwick?"

"Yeah. A sudden shear force twisted my leg just as it hit the ground." The team doctor prodded at her knee and she winced. "Don't know how he does it, but the bastard is playing with the GEM forces. You were right."

He squeezed her shoulder. "He's a dead man."

"Just keep your cool. The Wild Kat wants a win."

"You got it." He grabbed her hand and squeezed.

"Now get off the field and let them wheel me out of here." She gave him a mischievous grin, but he could see pain in her eyes.

The med staff wheeled her away. He watched with his hands balled into fists. The offense took the field, and Markus paced the sideline with angry strides.

"Welcome to the Halftime Report. Did you expect it to be this lopsided, Johnny?"

"If you ask me, they're lucky to go into halftime with only a 17-3 deficit. Coach Kaminski needs to make some big defensive adjustments in the second half if they're going to have any chance to win this game."

"Right, Johnny, especially with their best corner, Wild Kat Johnson, out with a torn ACL. The rest of the defense is going to have to step up."

"I don't see it happening, not with the Giants' Hardwick tearing up the secondary. I say the Giants win this one and advance to the Championship Game."

—The Halftime Report with Johnny and Ted

The locker room was quiet, the silence of a team without hope. Markus sat on the bench, chin on his fists, brooding. If only Kat hadn't been hurt . . .

His explosion in the film room lingered in his mind, along with Kat's sad, forced grin at his not-really apology. If only she had believed him.

But she had. She broke outside when he'd told her to. She wasn't the one who had lost faith. *I've been a real ass.*

She deserved better than she got. He'd put her on Hardwick's radar, but failed to see the whole picture. Hardwick had the last laugh af-

ter all.

No. I'm not letting that bastard win.

He stood and pounded his fist against his locker. "Yo, listen up."

"The hell, man?"

Markus raised his voice. "I never thought I'd see this team turn into a bunch of losers. Sitting around waiting for them to hand your asses to you in the second half? Not me."

"You miss the news?" the strong safety said. "Kat tore her ACL. Hardwick's gonna trample us."

Markus got into her face. "Hardwick's a cheat. He hurt Kat on purpose. You gonna let him get away with that?"

One of the linemen stood. "How the hell'd he do that?"

"I don't know. Some kind of miniature GEM generator or something. Sheared her knee with a microburst."

"Son of a bitch."

Most of his teammates were on their feet now, murmuring. Markus saw intensity in their eyes. "We going to let them get away with hurting Kat?"

"Hell no!"

"Then let's get out there and tear them a new one!"

His teammates charged out of the locker room, shouting. Markus followed.

"Wait up, Greene," Coach said from behind.

"What's up, Coach?"

"I appreciate you firing up the defense and all. Lord knows they needed it. But you can't just accuse a guy of cheating like that."

"But he is cheating. He manipulated the GEM forces, cut Kat's knee out beneath her."

"You have proof?"

"He was with the Fischer girl back in college—"

"Get off that conspiracy theory shit." Coach's eyes burned with intensity. "Get your head in the game and keep it there."

Markus glared at Coach for a long moment. "I'm right about this." He turned abruptly and trotted out to the field.

The offense got the ball first and started the half with a long scoring drive. "Now that's what I'm talking about," Markus said. "We're back in this game! Now let's do our part." He trotted onto the field with his defense.

"Will 'backer goes on a zone blitz, roll safety

coverage over Hardwick."

"Right, Coach." *He doesn't trust a backup cornerback one-on-one with Hardwick.* "Gee setting?"

"I'll go heavy, but count on them to bring it way down. They'll want to test Kat's backup deep."

Markus's weight decreased at the snap, and he dropped back to cover the middle of the field. He glanced left and saw Hardwick, as expected, bounding downfield. "McFee, stay on his outside shoulder."

"Huh?"

Hardwick was going to eat him alive. No time to think. Act. Markus scanned the backfield and saw his Will linebacker barreling toward the quarterback. He overshot, and the QB stepped up, scrambling, looking to set for the throw.

Markus charged forward, shooting into the line like a bullet. Too late. The QB planted his feet and heaved deep.

Markus planted both feet and launched himself, converting his momentum into a tremendous leap in the low gee. He threw his arms up and felt the sting of the ball deflecting off his fingertips. He heard the crowd roar, then fall silent as the ball drifted to the ground.

Coach's voice shouted in his ear. "What the hell are you doing out there, Greene?"

"Making a play."

"You left the middle wide open. If the QB had seen the slot receiver, she'd have gone for six."

"His eyes were glued to Hardwick all the way."

"Damn it, just stay in position."

Next play was a short pass over the middle. *Ub-uh, you ain't catching me away from home.* Markus drilled the tight end. Incomplete.

Screen pass, defended by the strong safety. Seven yard gain, fourth down. Punt.

By the end of the third quarter, down by three, Markus had the defensive rhythm down. Sandwiching Hardwick between McFee and the strong safety took him out of the game.

He can't cheat the deflection force if the QB can't throw the ball his way.

The offense scored the go-ahead touchdown midway through the fourth quarter, and the Giants changed strategy. Hardwick on intermediate routes across the middle.

Right in Markus's turf.

First time Markus got caught looking into the backfield. They dialed up the gee a few points and he bit on the run. Hardwick got behind him and turned upfield with the ball. The free safety saved Markus's ass with a nice open field tackle.

"Gotta watch those ACL injuries," Hardwick said with a vicious grin. "Could be a career ender."

Markus spit out his rebreather and turned, fists balled. "You looking to get popped?" He took a step after him.

Let it go.

He purposefully turned his head to the sidelines, breathing hard. "What's the call, Coach?"

"Cover one over Hardwick's side, but watch the crossing route. They like to dial the gee up on those, so I'm going to drop it a bit."

"Got it."

Gee stayed steady at the snap. Hardwick broke from McFee and cut across Markus's zone. The QB's head swiveled his way and the ball came out. Markus closed the gap, barreling full-tilt toward Hardwick.

Minimal deflection, stay steady.

Head lowered, braced for impact. Thump. His entire upper plastiform carapace stiffened. Hardwick collapsed on his back and the ball sailed overhead. Boos rained down from the crowd.

Yellow flag.

Damn.

"Pass interference, number 53, defense. Spot of the foul, first down."

Hardwick popped to his feet and grinned at him. "Maybe you need to twist a knee, too."

Rage burned Markus's face. "You're going down."

"Nah, on second thought, you're too much fun to play with."

Markus raised his fist, but McFee grabbed his arm from behind. An official stepped in the middle of it.

Coach's voice could have blistered his ear. "What the hell was that, Greene?"

"Guy needed his face rubbed in the turf. Still does."

"Get your head out of your ass or I'll sit you down."

"He was jawing about Kat."

"Two more like that and they'll be in field goal position. Now calm the hell down and do your job. Cover two, light, Mike blitz."

Markus swiveled his head to the sideline, incredulous. "You want me to blitz? You can't be serious."

"Do your job, Greene."

"You'll leave Hardwick wide open in the middle."

"Do your job."

Markus made the call and gravity went light. He launched himself up and forward, timing it so he landed right behind the left tackle. The tackles pulled a stunt on these blitz packages, and Markus shot the gap between them.

With low-gee, he made sure he came in high in case the QB lobbed the ball up. *If he gets the ball to Hardwick, he's gone.*

The QB pulled the ball down and side-stepped Markus, but then he had to deal with the defensive end barreling toward him. Markus landed light as a feather and twisted. His left foot absorbed a lot of his momentum before the plastiform at his ankle stiffened. But the twist launched him again, right at the QB's back. He jammed his shoulder into his back and took him down.

Markus popped to his feet, arms raised. The defensive end batted him on the helmet. "That's how you do it!"

Coach's voice sounded in his ear. "Now do you trust me?"

Markus deflated just a bit. "Sorry, Coach."

"Now let's close it out. "Cover two, light. You got Hardwick if he crosses the middle."

"Thanks, Coach."

Gee went up, slightly. Hardwick cut in front of Markus. No appreciable deflection, and he made the catch easily. Markus swore and dragged him down. Third and five coming up.

"Too easy," Hardwick said.

"That was your last one."

Hardwick sneered. "Get near me and you'll be on injured reserve before you know what hit you."

Rage rose again, but the voice in his headset stopped him cold. "It ain't no thing," Kat said.

Markus's head swung to the sidelines. Kat stood on crutches next to Coach, a wide grin on her face. "Good to hear your voice," Markus said.

"Get your game on," she said. "Hardwick's going to pull out all the stops, and you know what that means."

Coach took the headset from her. "We're going with the same defense, cover two, light."

It was normally the right call, Markus

thought, but it wouldn't work. Hardwick would take him out with his mystery force generator, sure as hell.

Play clock wound down, quarterback started his snap count.

He was out of time.

No.

He stood and made a T with his hands. "Time out."

"What the hell, Greene?" Coach's voice neared the threshold of pain. "Get to the god-damned sideline. Now."

He trotted to the sideline with the rest of the defense. "Sorry Coach, but we need to change it up."

"What the hell were you thinking? The offense might need that time out if the Giants score here."

"I know. But traditional defense isn't going to work here. I need you to trust me this time." He turned to Kat. "If we can't figure out how he's cheating the forces, and I mean right now, we're going to lose this game."

Kat nodded. "And your ACL. Or worse. We don't know how much force he can generate."

"Aw hell, you too?" Coach turned away, holding his head.

Kat swore in frustration. "How can we find his limitations if we don't even know how he's doing it?"

Limitations? Markus latched onto the word, rolled it around his mind. There must be boundaries. "Kat, what was the ball's deflection like when he took your knee out?"

"Low-g pass, it turned inward."

"Just like normal?"

"Yeah, just like—oh! He had to choose between the ball and my knee."

"Right. That's the key."

Coach interrupted. "Time's up. Get back out there. Cover two, light, you know the—"

"Go heavy, Coach."

"They *like* heavy on these crossing routes."

"I know. I'm counting on it."

"Then why the hell—"

"Just *trust* me, Coach."

"Get the hell out on the field."

Markus pulled his faceplate down and trotted onto the field. Everything hinged on Coach now. If he dialed the gee down . . .

The center snapped the ball.

A giant sat on Markus's back, squeezing the air out of his lungs and pressing his feet hard

against the turf. The plastiform at his ankles and knees stiffened. He smiled and sucked hard on his rebreather. Maintaining blood O₂ saturation was going to be critical.

Hardwick cut toward Markus, moving fast for the gee level.

Markus took tiny steps, running carefully in the high-g. Every step sent a shock wave through his legs and up his spine. He took a steep angle, one that would bring him behind Hardwick.

Choose, you bastard.

Hardwick hesitated. *Gotcha!*

Markus saw him make his decision. He sped past, taking the inside position. Where the ball would go without deflection.

You can shear my knee or counter the deflection. Not both.

Now came the hard part. With Hardwick committing to his position, Markus had little time to close the gap. He drove the balls of his feet deep into the turf, pushing himself to a dead run at high-g.

The ball came out of the backfield. Markus's chest burned, his heart thumped hard in his ears. His blood O₂ indicator flashed red as the numbers fell.

He thought he heard the crowd cheering wildly, or maybe it was Coach screaming in his headset. The ball sailed in a low arc, just ahead. Jumping was not an option at this gee. One more step.

Arm out, fingers extended.

The ball came in hot, stinging his fingers. He batted upward as hard as he could.

The ball looked like it stopped in place, tracing the slightest upward arc, before plummeting downward. He stumbled forward, a burning pain shooting through his ankle, and grabbed the ball with both hands.

His upper carapace stiffened with impact from behind. The ground hit with a sharp thump that sent a shock of pain through his back and chest. The whistle blew and normal-g returned. He lay on the turf, wheezing oxy-mix deep into his lungs, with the ball firmly clenched in his hands and Hardwick lying on top.

The home crowd of Giants fans was dead silent. He rolled over to get up, and Hardwick punched the ball. It shifted, and Markus tightened his grip. "It's over, man."

"No way," Hardwick screamed. "No way." He swung again, harder.

"Get off me, asshole." He balled a fist, ready to strike back. *No*. No way was he going to let his team down this time. Coach had put his trust in him, and for once in his damned life he was going to be worthy of it.

Whistles blew, and two officials pulled Hardwick from him. "After the interception, personal foul, number 81, offense. Fifteen yard penalty, first down."

Markus started to get up, made it to his hands and knees when Hardwick pointed his jaw at him and hit a toggle inside his faceplate with his chin. A blast of force caught Markus and threw him violently to the turf. His plastiform stiffened, but not before electric pain shot through his elbow.

Tens of thousands of spectators gasped as one. Markus crawled to his feet, grinning despite the pain. He'd just won, and from the look in Hardwick's eyes he knew it too.

Markus turned away without a word and limped off the field. The limp reminded him of the pain in his ankle. He was going to have to put in a lot of time in the training room to get healthy for next week. But there would be a next week. He knew in his heart that the offense would eat up the last few minutes and preserve the win. He trusted them. He trusted Coach.

Kat caught him on the sideline. "All right, spill. How did you keep him from ripping your knees up?"

"I gambled that he could only produce one force—either cancel the ball's deflection or take out my legs. So I gave him a choice."

She nodded vigorously. "You settled where the ball would go with the gravitomagnetic deflection force working. If he went for your legs, he'd never make the catch."

"Well, I am a genius, you know."

"But what if he had decided to take you out and take his chances on fourth down?"

Markus shrugged. "Another gamble. Your plastiform was supposed to stiffen fast enough to protect your knee from a shearing force, but apparently Hardwick's mystery force was faster. But I was running at high-g, so my plastiform stiffened every time my knee supported my weight."

"And they call me crazy?" She laughed. "You took a hell of a risk."

"Someone had to stop the guy. He was a menace."

"Greene!" Coach's voice carried across the sidelines. "What the hell was that out there?"

"Uh, Coach?"

"I'll tell you what it was. Damn good defense. Prettiest high-g interception I ever seen." An honest-to-goodness grin split his face, but only for a moment.

Markus gave him a nod. "Better get working on next week's game plan, Coach."

"In the wake of the GEM scandal surrounding Giants wide receiver Dom Hardwick, Fish-Co announced a breakthrough in the manipulation of the gravitomagnetic force. Researchers have been able to generate the little-known force independently of the gravitoelectric force by using a revolutionary technique that does not require the rapid rotation of heavy superconducting drums. A spokesman for Fish-Co says that a tiny prototype device was stolen from a secure research facility and somehow made its way into Hardwick's hands. Speculation centers on Marta Fischer, who had been romantically involved with the football star. Sources close to Miss Fischer indicate that the young woman had hoped to reconcile with her former lover."

—AP/UPI Newsnet ■

Alternate Abilities: The Paranormal

Edward M. Lerner

In 1995, two academic researchers were tasked with assessing twenty years of U.S. government and government-funded studies of “anomalous mental phenomena.” (You have seen the movie *The Men Who Stare at Goats*, right?) That awkward expression, “anomalous mental phenomena,” stands in for abilities more commonly labeled as—take your pick—“psi,” “paranormal,” and “extrasensory.”

One of the researchers—Jessica Utts, a statistician then at University of California Davis—reported:

Using the standards applied to any other area of science, it is concluded that psychic functioning has been well established. The statistical results of the studies examined are far beyond what is expected by chance. Arguments that these results could be due to methodological flaws in the experiments are

soundly refuted. Effects of similar magnitude to those found in government-sponsored research . . . have been replicated at a number of laboratories across the world. Such consistency cannot be readily explained by claims of flaws or fraud.¹

Reviewing the same information, her co-evaluator—Ray Hyman, then a University of Oregon psychologist—replied:

The occurrence of statistical effects does not warrant the conclusion that psychic functioning has been demonstrated. Significant departures from the null hypothesis² can occur for several reasons. Without a positive theory of anomalous cognition, we cannot say that these effects are due to a single cause, let alone claim they reflect anomalous cognition.³

¹ “An Assessment of the Evidence for Psychic Functioning,” Jessica Utts, <http://www.ics.uci.edu/~juts/air.pdf>

² The null hypothesis is the default assumption of any experiment: that events or variables under study are unrelated. Any assertion to the contrary must be convincingly proven.

³ “Evaluation of Program on Anomalous Mental Phenomena,” Ray Hyman, <http://www.ics.uci.edu/~juts/byman.html>

Confused about the state of evidence for paranormal abilities? Join the crowd.

In this article, we'll review some of the support—and objections to same—for the paranormal. We'll survey some science fiction reliant on the paranormal, consider this magazine's history with the paranormal, and take a look at the physics that might underpin paranormal abilities (if such exist).

Is parapsychology a science? Or is the paranormal in science fiction purely a trope, a bit of authorial legerdemain like a time machine? Read on. (Unless you're a precog, in which case you already know the answer.)

The paranormal

Merely the popular term *paranormal* is problematical. The expression *anomalous mental phenomenon* eliminates any implication of the supernatural, without defining some presumed scientifically accessible baseline (the “normal”) against which an anomaly is measured.

For the duration of this article, the phenomenon under discussion is: a mentally mediated transfer—whether of force, matter, or information—without technological assistance, under circumstances commonly understood to preclude such transfer.

Quite the mouthful. *Paranormal* has brevity going for it, and I'll use that term. (I'll retain the synonym *psi* when it appears in quoted text and in my discussion of such quotations.)

What might be examples of such transfers? Telepathy: the direct projection of thoughts to, or the reading of thoughts from, another's mind. Remote viewing: the perception of distant places.⁴ Precognition: the perception of

events before they occur. Psychokinesis (aka telekinesis): altering the physical state of a system from a distance. Mental healing: altering the health of an organism from a distance. Teleportation: relocating an object, including oneself, without recourse to muscles or artificial mechanisms. In this article, alas, space limits (of the most mundane sort: our page budget) preclude looking at equal depth at all forms of the paranormal.

Why consider such abilities? For one reason: because (per a 2005 poll) 41% of Americans report a belief in extrasensory perception and 32% in telepathy.⁵

In the beginning

Founded in London in 1882, the Society for Psychical Research was “the first society to conduct organized scholarly research into human experiences that challenge contemporary scientific models.”⁶ The SPR counted among its early members:

- William Crookes—chemist and physicist better known for his pioneering work with vacuum tubes.
 - John William Strutt, Third Baron Rayleigh—physicist better known for discovering “Rayleigh scattering,” the explanation for why the sky appears blue (and holder of a Nobel Prize for codiscovering argon).
 - Alfred Russel Wallace—biologist and naturalist better known for developing, independently of Charles Darwin, the theory of evolution through natural selection.
 - Carl Jung—psychiatrist and the founding father of analytical psychology.
- In two words: serious thinkers.

⁴ Funny story. The earliest description (to my knowledge) of remote viewing comes from Herodotus. In *The Histories*, he reports that the great king Croesus (as in “as rich as . . .”) sought to test the prominent oracles of his day. Via messengers, Croesus tasked the oracles to report what he would be doing one hundred days after those messengers had set out from Lydia. Not even the messengers knew. (The correct answer involved cooking lamb and turtle together in a bronze cauldron.)

The Delphic oracle got it right—in hexameter verse, no less—and so Croesus next asked for an augury involving matters of state. (Like all good auguries, the prophecy was ambiguous, and Croesus took it the wrong way. He invaded Persia and lost his kingdom.)

⁵ “Three in Four Americans Believe in Paranormal: Little change from similar results in 2001,” David W. Moore, Gallup News Service, <http://www.gallup.com/poll/16915/three-four-americans-believe-paranormal.aspx>.

To reach three in four required conflating the paranormal with the supernatural. In *this* article, you'll find nothing of ghosts, séances, reincarnation, astrology, or channeling of the dead.

⁶ Quoted from the home page of the Society for Psychical Research, <http://www.spr.ac.uk/main/>.

Studies of the paranormal

And yet, as we saw in the opening, more than a century later the case for—and against—the paranormal remains contentious. A closer look at typical studies will show why.

In 1927, J. B. Rhine, a botanist by training, established a lab at Duke University for the study of the paranormal. To make that research quantifiable and repeatable, Rhine pioneered the use of Zener cards: card decks of five easily distinguished shapes, designed by perceptual psychologist Karl Zener. Subjects were asked to identify—without looking—the shape on each of a long random series of the cards, sometimes after an experimenter had seen the card (i.e., by telepathy) and sometimes before (i.e., by clairvoyance). In trials that continued for more than a decade, Rhine reported subjects who indicated the correct card more often than sheer guesswork would explain.

A second phenomenon emerged in Rhine's studies: the longer the experiments continued, the less the observed improvement over random guessing. Does use of the paranormal diminish aptitude? Does boredom dull paranormal aptitude? (How long would *you* maintain your concentration on which of five shapes is up?) Does the Law of Large Numbers come into play, driving results toward the mean?

As for the validity of Rhine's results, not everyone is convinced.⁷

The U.S. government's exploration of the paranormal during the '70s and '80s was mostly performed by or on behalf of the CIA. These are the underlying studies alluded to in the opening, and this research focused on remote viewing. (If you ran a spy agency, wouldn't you appreciate a way to inspect places of inter-

est—say, suspected missile silos and nuclear-test sites—from the comfort and safety of your office?)

Many of these experiments involved a test subject and an interviewer isolated inside a windowless and shielded room (i.e., an enclosure designed to preclude signaling via electromagnetic radiation). The test subject was tasked to describe what a third party was seeing—or in the case of precognition experiments, what the third party would see. The interviewer would ask questions to clarify what the subject saw. Subject/interviewer dialogues were recorded; sometimes the subject would sketch or build clay models of the distant scene. The perceived scene (as captured in the recordings and any sketches and models) and the actual scene were then compared and the degree of match graded. In one test series, the locations were chosen from among sixty points of interest randomly visited across greater San Francisco; scoring depended on an evaluator identifying from the test subject's remote-viewing report the place the third party visited.

The lead experimenters for the CIA studies were Russell Targ and Harold Puthoff, both laser physicists. Some of their early results with remote viewing appeared in two prestigious journals: *Proceedings of the IEEE*⁸ and *Nature*,⁹ and Targ continues to cite these papers in substantiation of his claims.

On the other hand, *Nature* accompanied Targ's article with an editorial that stated:

There was agreement that the paper was weak in design and presentation, to the extent that details given as to the precise way in which the experiment was carried out were disconcertingly

⁷ For example, from a 1998 interview in *Skeptical Inquirer* with Martin Gardner (longtime math and science writer for *Scientific American*):

"It has often been pointed out that as Rhine slowly learned how to tighten his controls, his evidence of psi became weaker and weaker. However, the evidence will not become convincing to other psychologists until an experiment is made that is repeatable by skeptics. So far, no such experiment has been made."

See http://www.csicop.org/si/show/mind_at_play_an_interview_with_martin_gardner/

⁸ "A Perceptual Channel for Information Transfer over Kilometer Distances: Historical Perspective and Recent Research," Harold E. Puthoff and Russell Targ, *Proceedings of the IEEE*, March 1976. (IEEE is the Institute of Electrical and Electronics Engineers, an international professional society.)

⁹ "Information transmission under conditions of sensory shielding," Russell Targ and Harold Puthoff, *Nature*, 18 October 1974.

vague. . . . All the referees felt that the details given of various safeguards and precautions introduced against the possibility of conscious or unconscious fraud on the part of one or other of the subjects were “uncomfortably vague.”

A few years later, *Nature* published an additional disclaimer: an article by psychologists unable to replicate Targ and Puthoff's results.¹⁰

While the remote-viewing experiments reduced or eliminated the “decline effect” sometimes attributed to subject boredom, in the process they sacrificed objective scoring. Consider the complexity of scoring these experiments. In how many features, and in what details of particular features, can the remotely viewed scene and the actual scene differ and still be counted as a match? Suppose the subject sketches a scene with several points of similarity to the visited location—but adds other details that correspond, if at all, only with structures that *were* present decades earlier. Does that circumstance count as a mismatch or as an instance of viewing remote in space *and* time?

In short, the determination of a match in each remote-viewing experiment was subjective, putting into question claims of statistical significance when aggregating results across several experiments.

The CIA's motivation, of course, was not scientific curiosity, and the Agency insisted upon more practical demonstrations. Test subjects were given geographical coordinates and asked to describe what they saw. One designated location corresponded to a suspected Soviet research facility that had been observed by spy satellite. The subject sketched a large crane in significant detail, matching a structure in the satellite image—and also several buildings that did not exist. Proponents of remote viewing claim credit for the crane. Skeptics focus on the discrepancies—and indeed, the subject *might have* drawn bunches of structures in the hopes of getting one right.

In another test, a CIA agent gave the coordinates of his private cabin in the woods. The test subject came back with a description with similarities to a nearby NSA facility. Was this ex-

periment a success (the subject was drawn to a facility of claimed psychic significance to the CIA) or a failure (the viewed scene was not at the specified coordinates)? In the same experiment, the subject reported reading words and phrases out of file cabinets. Some of the vocabulary matched out-of-date NSA code words. Was this a success (real code words detected from a distance)? Or did those words popping up somehow reflect that those code words had been in effect when Targ, the interviewer in the room with the subject, had worked for the NSA?

Interpretation

In short, proponents and skeptics alike claim support for their positions from these studies. Such divergence can reflect honest differences of opinion. For a particular event of claimed paranormal significance, it's no small task to ascertain a probable cause. Was an anomalous phenomenon at work or something more mundane? How does one preclude every alternate explanation of:

- Fraud (whether by test subject or experimenter).
- Unintentional cuing (the test subject responding, even subconsciously, to the observer's reactions).
- Experimental design flaws.
- Wishful interpretation of ambiguous results.
- Statistical outliers (toss a coin often enough and you *will* see ten heads in a row).

Some skeptics discount any asserted demonstration of the paranormal until fraud can be ruled out—no proof of actual fraud required. Are paranormal researchers guilty until proven innocent? Isn't that an unjust standard? As we've seen, researchers in the field often have significant scientific credentials.

The counterargument: scientists are unprepared for experiments that might lie to them. Per Carl Sagan, “Scientists are used to struggling with Nature, who may surrender her secrets reluctantly but who fights fair . . . Magicians, on the other hand, are in the de-

¹⁰ “Information transmission in remote viewing experiments,” David Marks & Richard Kammann, *Nature*, 17 August 1978.

ception business.”¹¹ James P. Hogan, in his novel *Code of the Life Maker*, used a magician cum mind reader to drive home the same point.

Given (a) the ambiguities of the experiments and (b) the absence of a physical mechanism to explain the reported results, many scientists discount the whole paranormal topic.

The requirements for science fiction are less rigorous. As long as the paranormal hasn’t been disproven, there is ample latitude for storytelling. . . .

The paranormal in science fiction

There’s a lot of the paranormal in science fiction, literary and dramatic.¹² and I’ll limit myself to a few examples organized by paranormal ability. Almost always that ability manifests without any more explanation than that a character has a gift or a mutation, takes a drug, or survived traumatic events that awakened an ability latent in everyone. At the physical level, any of those is no explanation at all.

As illustrations, I lean toward classics of the field.

Telepathy, mind reading, and empathy:

- Alfred Bester’s 1953 novel *The Demolished Man* (incidentally, the first Hugo Award winner) explored the effects on society of telepathy.
- Robert Heinlein, in *Time for the Stars* (1956), used telepathy between separated twins for instantaneous communications between starship and distant Earth.
- The *Star Trek* TV/movie franchise has the often plot-convenient Vulcan mind melds.
- David Brin’s Uplift Universe series offers the Tymbrimi species, members of which cast and receive emotional “glyphs” through cranial tendrils.
- Richard Phillips’s 2012 Rho Agenda series, whose heroes, their minds tweaked by alien technology, learn to communicate telepathically.

Teleportation:

- Again from Alfred Bester, from 1956, we

have *The Stars My Destination* (in the UK, *Tiger! Tiger!*) extending teleportation (“jaunting”) to interplanetary distances.

- From Steven Gould, in 1992, we have *Jumper* (later a movie by the same name) and its sequels, *Reflex* and *Impulse*.

Psychokinesis (aka telekinesis):

- From 1952, in the pages of *Astounding*, Jack Vance’s novella “Telek.”
- The 1981 movie *Scanners*—see heads explode!
- Stephen King’s 1974 debut novel (and later the movie) *Carrie*—see lots of stuff explode and burn and . . .

Miscellaneous psychic powers:

- Precognition, as in Philip K. Dick’s “Minority Report” (later adapted as a movie).
- Mind control, as practiced by Jedi and Sith alike in the *Star Wars* universe.
- Psychic navigation, as performed by spice-altered navigators of Frank Herbert’s *Dune* series (several of which were first serialized in *Analog*).
- Psychic wish fulfillment, as in Jerome Bixby’s eerie 1953 story “It’s a Good Life.”
- Multitalented paranormal supermen: A. E. Van Vogt’s *Slan* (first serialized in *Astounding*, September through December 1940).
- And given the degree of skepticism as to whether paranormal phenomena even exist, let us not forget hoaxers such as the private investigators on the popular TV series *Psych*.

That’s but a small sampling, with these (and other) psychic powers popping up in science fiction of every length, in all media.

John W. Campbell, *Analog*, and the paranormal

In 1937, a few months before John W. Campbell took over the editorial reins at *Astounding*, his story “Forgetfulness” appeared in the magazine.¹³ In that story, alien starfarers visit a far-future Earth whose few human residents appear to be in terminal decline. The latter have abandoned ancient cities of mile-high

¹¹ *The Demon-Haunted World: Science as a Candle in the Dark*, Carl Sagan, 1996.

¹² And also, for completeness, in video games (e.g., telekinesis in BioShock) and graphic novels (e.g., a variety of abilities among the X-Men). This article won’t look further at those media.

¹³ Like many of Campbell’s best, this story appeared under his Don A. Stuart pseudonym.

towers to live in twenty-foot domes. Communicating telepathically with their visitors, humans appear at a loss to explain anything about technologies once wielded by their mighty ancestors. It's sad, the aliens think, as they prepare to colonize—only to experience time and space bent by the thoughts of a super-evolved human for whom spaceships are almost as quaint as flint arrowheads.

SF encyclopedist Brian Stableford speculates that Campbell was predisposed toward paranormal possibilities by reason of having attended Duke University while J. B. Rhine was performing his famous series of experiments there. Whether or not that's the case, the paranormal (which Campbell preferred to call "psionics") fascinated the man. In a 1959 editorial "We Must Study Psi"¹⁴ Campbell wrote:

Dr. Rhine originally started his investigation of psi because, as a professional psychologist, he had come to the conclusion that psychology-as-such lacked an essential element. You would have an exceedingly hard time working out biochemistry, if your chemistry hadn't discovered nitrogen, for example. Rhine's studies led him to suspect something about as important as nitrogen to biochemistry was missing from psychology.

And:

Ours is the only culture that officially denies magic. And . . . ours does not, by several millennia, qualify as a "very long" culture. The denial of magic is only about three centuries old. You can fool a large percentage of a people for that short a period of time.

The psi machines I've encountered work—and they work on precisely the same ancient laws of magic that those wide-scattered peoples have, independently, accepted.

In the same editorial, Campbell discusses dowsing, the Hieronymus machine,¹⁵ and the application of psi to *photos* of crops to protect physical crops from insects.

A bit more about Campbell: He studied physics at MIT and completed his B.S. at Duke University. Isaac Asimov called Campbell, "the most powerful force in science fiction ever, and for the first ten years of his editorship he dominated the field completely."¹⁶

As editor, Campbell treated psi as a core element of "hard"—that is, scientifically based—science fiction. Convinced or not, many *Astounding* authors of the Campbell era incorporated the paranormal into their stories (some of which we've already seen).

But just suppose

I mostly write the hard stuff: science fiction that won't cause scientists and engineers to hurl my books across the room in dismay. (Such, anyway, is my goal.) Could I, were I to so choose, write hard SF involving the paranormal?

As it happens, yes.

Rhine and Targ did not attempt to explain the paranormal, only to demonstrate the effect and to make observations. Targ asserts that remote viewing is both unaffected by electromagnetic shielding and insensitive to range over terrestrial distances.¹⁷

Having already looked at the controversy surrounding efforts to exhibit the paranormal, let's ask a different question. Does modern physics suggest ways in which minds *could*

¹⁴ *Collected Editorials from Analog*, selected by Harry Harrison, 1966.

¹⁵ A device said to sense the material-specific "eloptic energy" emanations from solid objects. The term *eloptic* seems intended to evoke thoughts of electromagnetism and optics. The detector required a person in the loop, and Campbell saw the device as dependent upon its operator's psi abilities. See http://en.wikipedia.org/wiki/Hieronymus_machine.

¹⁶ *I, Asimov: A Memoir*, Isaac Asimov, 1994.

¹⁷ Or in at least one instance, tested the paranormal at a range far exceeding the terrestrial. In a 1973 experiment, Targ's subject, while remotely viewing Jupiter, sketched that planet with rings. Voyager 1 first glimpsed rings of Jupiter in 1979. Did the rings in that sketch stem from remote viewing, extrapolation from Saturn's rings, or a lucky guess?

Before you answer, consider that in *Gulliver's Travels* (1726) Jonathon Swift gave Mars two small, close-orbiting moons—long before astronomer Asaph Hall first observed Phobos and Deimos in 1877.

have such paranormal abilities?

For at least some of the claimed abilities, yes.

Getting on the same wavelength?

Consider extremely low frequency (ELF) electromagnetic radiation, with frequencies of just a few Hertz (aka, cycles per second). Any wave's frequency and wavelength (the distance that separates two adjacent crests) vary reciprocally; ELF radiation—with wavelengths in the thousands of miles!—passes unimpeded through the thin metal sheets and screens that comprise conventional shielding.

To an ELF wave, the Earth's surface and the ionosphere are two sides of a naturally occurring waveguide. Whereas freely propagating electromagnetic radiation (say, the light emitted by a bulb) spreads in all directions and rapidly attenuates with distance according to an inverse square law, EM waves confined to a waveguide (say, light traveling through a fiber-optic cable) propagate in one direction, along the waveguide—and do not attenuate.

No attenuation and immunity from conventional shielding; that sounds like a candidate mechanism for the paranormal. Right? No, and it's again related to ELF radiation's long wavelengths. Not only does no known structure in the human brain generate or receive ELF waves, it's hard to see how the brain, or even the entire human body, could interact with waves thousands of miles long.

From the large to the very small (a necessary digression)

A more promising option can be found in quantum mechanics: the branch of physics that describes phenomena at atomic (and smaller) scales. To appreciate how quantum mechanics might apply, we must first take a

detour through classical (pre-QM) physics.

Our intuition and experience tells us that separated objects do not interact. Isaac Newton, despite the tremendous predictive power of his formula in characterizing gravitational attraction—after more than three centuries, it's accurate enough to plan most NASA space missions—struggled with the counterintuitive implication of his equation: that somehow gravity acts at a distance.¹⁸ Indeed, Newton called the notion, “so great an Absurdity that I believe no Man who has in philosophical Matters a competent Faculty of thinking can ever fall into it.”

Newton was correct to have doubts. Albert Einstein's more complete theory of gravity, formally known as General Relativity, shows—simplifying furiously—that the gravitational attraction seemingly exerted between objects across great distances actually results from (a) mass warping space-time and (b) one object interacting with the *local* curvature of space-time caused by that other object. Or, as physicist John Wheeler so elegantly (if anthropomorphically) captured the essence of General Relativity in twelve words: “Matter tells space how to curve. Space tells matter how to move.”

Among the eerier attributes of quantum mechanics is *nonlocality*: interaction between distant objects without any intermediary . . . anything. Two particles (such as electrons) that once interacted and then separate can maintain a relationship known as quantum entanglement. For as long as the particles remain entangled, a change in one (say, the orientation of the first electron's spin) causes a complementary change to the second (makes it spin in the opposite orientation). The entanglement mechanism operates independently of distance—and instantaneously.¹⁹ Through entanglement, the paired particles become, in

¹⁸ Newton's equation: $\text{Force} = Gm_1m_2/R^2$, where F is the attractive force between two masses, G is the gravitational constant, m_1 and m_2 are the two masses attracting one another, and R is the separation between those masses.

For the Earth and the Sun, R is about 93 million miles—that would be action at *quite* the distance.

¹⁹ Does the instantaneous nature of quantum entanglement mean Einstein was mistaken about light speed as the universal limit? No, because no *thing* can go faster than light is not a precise statement of the limit. Special Relativity says that no *information* (of which a physical object is an example) can exceed light speed in a vacuum. Entangled particles cannot be used to convey *information* faster than light. Why not? Because signaling via entanglement requires ambiguity in the states of the paired particles. Measure the state of one particle and you learn something about the state of the other particle—without knowing how the act of measurement disturbed the system. That ambiguity precludes information transfer at superluminal speeds.

some sense, a single entity.

Einstein called this entangled behavior “spooky action at a distance” and considered it evidence of a crack in the foundations of the then-young theory of quantum mechanics. This time, Einstein was mistaken. Quantum entanglement has been demonstrated again and again. In the case of paired photons, entanglement has been demonstrated over distances approaching one hundred miles (for particles with mass, the distances are better described in yards). But it should be noted that entanglement between particles is a fragile affair. The slightest jostling of either entangled particle can destroy the relationship.

Spooky action at a distance? Freedom from attenuation with distance? A connection that is independent of electromagnetism (and so, the link would be unaffected by EM shielding)? That sure sounds like a candidate mechanism for the paranormal.

But how?

Much as Newton felt uneasy about the implications of his model for gravity, scientists continue to argue about the physical significance of the mathematical description that is modern quantum-mechanical theory.²⁰

Very briefly, QM is inherently probabilistic. Its math never says, as one example, where an electron *is*. Instead, QM enables us to calculate how apt we are to find that electron here, or there, or anywhere else. A time-varying mathematical entity called the “wave function” captures the probability of where the electron might be found.

Of course, when we do measure an electron’s position, it’s not here and there and somewhere else—it’s in a particular spot.

The plurality of physicists surveyed say of this dilemma: don’t ask. Others speak to the act of measurement as “collapsing the wave function” to the unique location where the electron is observed. Then there is the QM interpretation of immediate relevance. Such prominent physicists as Eugene Wigner and John von Neumann have (at times) asserted the need for a *conscious observer* to determine the outcome of observations. In this in-

terpretation, the physical universe requires consciousness to operate.

Combine the nonlocality of quantum entanglement with an intrinsic connection between matter (such as a brain) and consciousness and—voilà—we have a candidate mechanism for the paranormal.

Emphasis on *candidate*.

As fascinating as the media find polls, science doesn’t operate by ballot. It may nonetheless be worth noting that the conscious-observer approach is far from a leading interpretation of QM. Perhaps because of the chicken-and-egg riddle it would pose regarding brain-made-of-matter and conscious mind. Perhaps because of the riddle it would pose as to the feasibility of matter existing before brains to observe quantum interactions. Perhaps because we don’t know what consciousness is. . . .

Although science has yet to reach any consensus on the underlying meaning of quantum mechanics *or* the nature of consciousness, mathematician and physicist Roger Penrose and anesthesiologist Stuart Hameroff propose that consciousness arises from quantum-mechanical effects within submicron intraneuron structures called microtubules.²¹

If *that* conjecture is valid, then, just maybe, ensembles of microtubules across the brain also cooperate to transmit and receive quantum-entangled particles at longer ranges (i.e., beyond one’s own skull). And maybe other ensembles of microtubules in the brain can categorize, manipulate, and otherwise work with the associated data. (To remotely view a designated scene, for example, the subject must have a way to identify and focus upon specific relevant entanglements.) And perhaps eons of evolution developed ways to maintain entangled states over longer times and distances than does the latest human technology.

In short: piling conjecture upon speculation upon surmise we can glimpse a basis, drawing upon contemporary (although not prevailing) scientific thinking, for a mechanism that might underpin some paranormal phenomena.

None of which says the paranormal does work that way, or even that the paranormal ex-

²⁰ As I discussed in more detail in “Alien Dimensions: The Universe Next Door,” in the April 2014 *Analog* issue.

²¹ See *Shadows of the Mind: A Search for the Missing Science of Consciousness*, Roger Penrose, 1994.

ists. I am saying the case can be made sufficiently to justify the paranormal in *science fiction*.

I knew you were going to ask

What about claims of precognition? One of Targ's remote-viewing subjects claimed he could *preview* the location where the roaming experimenter would visit. Can we identify any candidate mechanisms for that?

Imagine a video of milk separating itself out of a latte. Most people would suspect the imagery was running backward. Why? Because for the milk to spontaneously separate from the black coffee is so improbable. That we implicitly recognize the universe's tendency toward disorder is one theory for why we experience time flowing in one direction. Metaphorically, that flow is called "time's arrow."

If time flows one way, from past to future, how might precognition be possible?

Once more, we catch a tantalizing glimpse in the workings of quantum mechanics.

The double slit experiment with delayed choice

Among its many weirdnesses, quantum mechanics embraces a curious duality. Such entities as electrons and photons sometimes behave like particles and sometimes like waves. This duality is best illustrated with the oft-performed double-slit experiment.

A device we will call an emitter shoots photons one by one toward a screen. Between the emitter and the screen sits a foil obstacle that is solid except for two slits. A photon can only reach the screen by passing through one or both slits in the foil. So does the photon pass through one slit, like a particle? Or does it pass through both slits, like a wave? If the former, the photon will light up one small spot on the screen. If the latter, the photon wave will spread out from both slits, forming a distributed interference pattern on the screen.²²

The trick answer: the outcome depends on how we perform the experiment. If we watch the slits and see where the photon goes, the screen shows a one-spot (photon as particle) result. If we do not watch, the screen shows an interference pattern (photon as wave) result.

Honest. That's how it works.

The physicist John Wheeler proposed a variation on the double-slit experiment. The screen in his experiment is removable. Behind the screen are placed two detectors, each aligned with one of the foil's two slits.

So: if the screen remains in place and we don't watch the photon going through the foil, we'll see an interference pattern on the screen. If we remove the screen, the photon must strike one of the two detectors.

Now comes the interesting, "delayed choice" part of Wheeler's experiment. Let t_1 be the time the photon reaches the foil. Let t_3 be the time when the photon will reach the position of the removable screen.

We may (with very fast reflexes) whisk the screen from the experimental apparatus at time t_2 , where $t_1 < t_2 < t_3$. If and when we remove the screen in that way, one of the two detectors registers a hit. That is, we have forced the photon to have gone through one or the other slit.

Did the photon keep an eye on us, and see how we tried to trick it? If so, that's one very clever photon! It seems at least as likely that our action at t_2 , whisking away the screen, retroactively determined what (appeared to have?) happened at t_1 . In plain English, it looks like we had an influence backward in time!

To complicate matters further, we (or the apparatus we built), by choosing to pull out the screen, or not, play a role in the experiment's outcome. Is the photon's response to our intervention a vote in favor of quantum consciousness?

This delayed-choice experiment has been performed and the backward-in-time influence verified.²³

²² Each slit becomes a new wave source, radiating toward the screen. Each wave has crests and troughs. Where the two spreading waves encounter the screen crest-of-one on top of trough-of-the-other, the waves cancel. At such a point, the screen shows nothing. Where the two waves encounter the screen crest upon crest or trough upon trough, the waves add. There, the screen shows a strong signal.

²³ For a more complete exposition of the double-slit experiment with delayed choice (with supporting video), see "Funny Things Happen When Space And Time Vanish," by Marcelo Gleiser, at <http://www.npr.org/blogs/13.7/2013/05/28/186886914/funny-things-happen-when-space-and-time-vanish>.

So: if the paranormal is a manifestation of quantum entanglement and quantum particles react (in at least one plausible interpretation of a real-world experiment) to a future event, then precognition would appear to be plausible.

Quantum teleportation

Fooled you!

Although physicists speak of quantum teleportation, they're referring to quantum entanglement, not to teleportation in the popular, "Beam me up, Scotty," sense.

A binary digit (bit) in a digital computer has the value of either zero or one. A quantum bit (qubit) can take the value zero, one, or—everything quantum is weird—unknown. More precisely, that third condition is an indeterminately weighted combination (in QM-speak, a superposition) of the zero and one states. The values of a qubit can be encoded on a quantum particle, such as an electron with any of: spin oriented up, spin oriented down, or spin "don't know."

We'll take two quantum particles (say, electrons) and encode them with data. If they are not identical, they can, with great care, be entangled. To be entangled, then, one is spin up and the other spin down—or both are spin indeterminate. We separate the entangled electrons, very carefully, doing nothing to either disturb or measure their spin states.

Now we measure the spin state (qubit value) of one of the entangled electrons. When we do, our action also immediately determines the spin state of the other half of the entangled pair. If we measure spin up, the remote electron is spin down. If we measure spin down, the remote electron is spin up. No measurement gives a result of "spin unknown" because the act of measurement—like the act of passing through a slit in foil—forces a specific outcome.

In a sense, reading the spin state of one electron has transferred a spin state to the distant member of the pair. In theory and (to any known experiment) in practice, nothing travels between the two electrons. Change to the entangled particle just happens. That's what physicists call quantum teleportation. The

mechanism seems (at the least) to be insufficient for the paranormal conveyance of physical objects.

From which we conclude

Some experiments—none without controversy—suggest the existence of paranormal phenomena. Said phenomena—if they exist—are unaffected by electromagnetic shielding and, at least on terrestrial scales, insensitive to distance. Some interpretations of quantum mechanics and consciousness—also contentious, but nonetheless academically respectable—appear to be compatible with reports of telepathy, remote viewing, and precognition.²⁴

That's a lot of qualifiers—

But nowhere in there do I see a *disqualifier* for the use (with great care) of at least these so-called paranormal abilities in even hard SF. ■

To read further:

The Wizards of Langley: Inside the CIA's Directorate of Science and Technology. Jeffrey T. Richelson, 2002 (chapter "The CIA's Psychic Friends").

The Reality of ESP: A Physicist's Proof of Psychic Abilities, Russell Targ, 2012.

<http://rhine.org/> Website of the Rhine Research Center.

<http://tvtropes.org/pmwiki/pmwiki.php/Main/PsychicPowers>.

Science Fiction and Science Fact: An Encyclopedia, Brian Stableford, 2006, articles on parapsychology and John W. Campbell.

About the author

A physicist and computer scientist, Edward M. Lerner toiled in the vineyards of aerospace and high tech for thirty years. Then, suitably intoxicated, he began writing science fiction full time. When not prospecting beneath his sofa cushions for small change for his first spaceflight, he writes technothrillers like *Energized* (powersats), the InterstellarNet adventures of First and Second Contact and, with Larry Niven, the *Fleet of Worlds* series of space operas. Ed's website is edwardmlerner.com.

²⁴ If a candidate physical explanation exists for psychokinesis, mental healing, or the teleportation of physical objects, I have not seen it.

The Journeyman: In the Stone House

Michael F. Flynn

**"The trail is the thing, not the end of the trail."
—Louis L'Amour**

A Peep at the Wall

The Great Escarpment edged World along its northern marge, from the Hill Country in the far west to the eastern verge of the shortgrass prairie. But there, an unexpected southward spur pinched World into a narrow waist through which all men must pass should they travel east or west. It was no great surprise to Teodorq sunna Nagarajan the Ironhand, who was cunning in all matters relating to stalking and ambush, to find the neck between sheer cliffs and steaming swamplands stoppered by a stronghold nestled against the flank of the escarpment. But never had he seen a fastness so large and built entirely of great stone blocks. Atop the walls men in iron kept watch on east and west and—of greater immediate interest to Teodorq and his companion—south. But being wise in the ways of camouflage, Nagarajan's son remained hid-

den from their gaze in a grove of trees a gallop south of the cliffs while he considered ways in which that happy state could be continued and his eastward journey resumed.

Round about the stronghold huddled scores of lesser dwellings, cattle and sheep pens, yapping dogs, curling smoke from under which issued irregular clangs. Smells of dung and compost floated with the burnt tang of the smoke. Beyond the settlement a waterfall plummeted from the very lip of the plateau, and from that direction issued a steady thump, as if a frost giant strode the earth.

Earlier that morning several wagons bearing men with farming implements had ridden west under a mounted escort. A practiced eye—and Teodorq possessed two such—estimated upwards of four hundred habitants in the settlement, the largest village he had ever seen.

Even though most of the villagers were not

warriors—Their farmers needed guards against the shortgrassmen!—Teodorq doubted he could take them all, especially those wearing iron shirts and carrying long iron swords. Not even with Sammi o' th' Eagles to help.

"Hey," he whispered to his companion, "you hillmen build stone houses, don't ya?"

Sammi shrugged without moving. "Not so big." The hillmen were ancient enemies of Teodorq's people, but the two young men were alike strangers in a strange land and had perforce become allies.

"Least now we know why the shortgrassers call 'em the ironmen. Must get hot in them outfits come summer."

"Maybe star-folk, like Jamly tell us find?" suggested Sammi. "Big magic, pile stones so high."

Teodorq studied on that some. Farther west, where the shortgrass prairie gave way to the Great Grass he had once called home, he and Sammi had come upon an ancient wreck, a "shuttle" that had tumbled down from the sky in the long ago. Jamly, a drawing that somehow moved and spoke and who had been custodian of the shuttle, had sent them forth to find the settlements of labran and Varucciyamen, so that the starmen might come and salvage what remained.

For Teodorq, seeking out the star-folk had a better ring than fleeing from the Serpentes who pursued him. "Don't think so," he finally decided. "That *shuttle* was made of pottery—whatcha call it, *esramig*?—not stone. And when Jamly killed them Serps following me, she used a buzzing fast stonethrower, which I don't see they got over there. Hey, hillman, how do you build a stone house?"

Sammi glanced at him. "With stones?"

"Yah, you lay one row on top another row. Yonder—" He nodded toward the stronghold. "—they forgot to stop adding rows. So, no magic. Least not shuttle-magic." He wondered how they lifted the blocks onto the highest rows. Maybe that *was* a giant he heard hammering away in the distance.

Sammi grunted. "Jamly Ghost say much kenning lost since big-fight-in-sky. Stupid plainsmen forget most; hillmen not so much. Maybe ironmen forget less." He pursed his lips. "We stay in trees, iron hats no see us. Sneak past stone house, then ride like hell."

The woods they lurked within contained more trees than Teodorq had ever imagined grew on World. But he did not suppose that the men in the iron hats were stupid, and he expected the trees would soon give way to cleared ground. What man would build a stronghold to guard the passage and then allow trees to screen passers-by?

"I dunno, hillman," said Teodorq, pointing toward the distant wall. "Them sidemen up there, we know why they're watching the west. Shortgrassmen don't like they come down off'n the cliffs and taken their prairie. But they're studying on the east, too. And before we 'ride like hell' into it, I wanna know what they're so keen on spotting."

Sammi looked at him. "Sometimes, for plainsman, you not so stupid."

"Beside," Teodorq said, "I wouldn't mind sneaking in there and getting me one of them *swords*."

"Sammi take back what he say."

They watched a while longer in science. Then Sammi sighed. "How you plan get one?"

"First . . . We need to find a way into that stone house."

Behind them they heard a click.

Teodorq looked at Sammi. "*That* can't be good."

They turned to see a mounted figure dressed in dun leather and aiming a crossbow at them. "Be pinned to the spot, sodbusters, or be pinned to it."

It was a woman's voice and spoke the *plavver* of the shortgrassmen with an odd accent, harder on the final consonants, careless of the vowels, and swallowing the liquids in the throat. Teodorq said to Sammi in the long-grass *sprock*, "Only one bolt."

The hillman shrugged. "Sammi always remember kindness of stupid plainsman."

"Why?"

"You bigger. She shoot you first. Sammi get away while reload."

As if intuiting their discussion, the woman whistled sharply and four men emerged from the trees, one of them leading the horses and pack mule Teodorq and Sammi had picketed in a hidden meadow. "Turn you right about now and start you a-walking toward yon *sawak*." When Teodorq feigned incomprehension, she gestured with the crossbow, indicating by signs what they were to do.

"Awright, babe, we get it. C'mon Sammi, let's go." The two turned and began walking toward the stone house, striding for all of World as if they were leading the others home.

Sammi commented dryly in the hill country *lingo*. "First part of plan working. Got second part?"

Teodorq shrugged. "Not yet."

A Snake in the Hall

They put Teodorq sunna Nagarajan and Sammi o' th' Eagles in a cage below ground level. Now and then, Teddy could make out indistinct curses from more dark and distant cages. This was apparently to inform the two how fortunate they were. Teodorq shook the bars on the cage door, but he did not expect the door to swing open, and so was not disappointed when it failed to do so.

Gaging was a deadly insult on the Great Grass, but Teodorq told his companion he would forswear his revenge.

"Smart move," Sammi told him. "Vengeance hard for man locked up in cage."

"I plan to get out."

"Good," said Sammi, bending over to inspect the lock mechanism. "Now two of us have same plan. How you pick lock?"

"With my tongue."

Sammi rose, turned, and looked at Teodorq without speaking.

"I still want to get me one of them swords," the prairieman said. "So, step one is get out o' this cell."

"No, that step two. Step one got us into it. Remember?"

When the guards came for them the next morning, Teodorq acted as a guest summoned for council rather than a prisoner for interrogation. He and Sammi were escorted to a long flag-stoned hall illuminated by torches, between which hung colorful banners bearing fantastical creatures and sigils. Sidemen in kilts and iron shirts lined the hall, each holding a man-tall, iron-tipped lance.

The lines of the vault, the floor, and the sidemen led the eye to the focal point, which was an elaborate chair atop a raised platform at the far end of the hall. Upon this chair perched a barrel-chested man with heavily muscled arms and hands that looked as if they

could crush a man's skull. He wore a gown of delicate weave, dyed bright red and bearing on its front in thread-of-gold the image of a great striped cat. Across his shoulders and layered on his lap was a cloak of what appeared to be the pelt of the same animal: black stripes on white fur. In his hand he held a ceremonial, jewel-encrusted hammer. Teodorq estimated more *schmuck* in that hammer than in the aggregate wealth of the Scorpion and Serpentine clans combined, and he fell to considering how such an item might come into his possession.

On the platform below the high seat, a miscellany of others, variously garbed, sat or lay among cushions. One was the girl who had captured them. She still wore hunting leathers, but had exchanged her crossbow for a hoodwinked falcon that perched upon a thick glove while she fed sweetmeats to it.

A crier announced something in a strange tongue, packaged in which Teodorq caught the name of "Aya Herpstone, *kospathin*." From the salutes that followed, this was evidently the fierce man on the big chair.

"*Kospathin* . . ." Teodorq murmured. "I'd say he's the First here'bouts."

"Sammi never cease to marvel at swiftness of plainsman mind."

The sidemen who had taken custody of the captives pushed Teodorq and Sammi forward and by signs indicated that they were to bow over their folded hands. Teodorq remembered that Jamly had used the same salute and wondered if these folk might be the starmen, after all. Teodorq added the plainsman's salute, touching his fingertips to his temple then slicing his hand forward. Sammi slapped his right bicep and raised his forearm.

The *kospathin* leaned on the arm of his big chair and growled something in a back-throated language. The young woman spoke up in the shortgrass *plavver*.

"My father asks whether or no ye be spies for the *kraal* of Bowman."

Teodorq answered in the *sprock*. "Sorry, babe. We don't get ya."

Sammi grunted, understanding that Teodorq had spoken to him and not to the girl. He folded his arms across his chest and waited.

The girl frowned and a small crease appeared in her brow just above her pert nose.

"You speak a tongue most strange. Whence come ye here?"

Teodorq again feigned incomprehension. The *kospathin* said something to her and she answered. The hard, growling words of iron talk fell strange off such soft lips as hers. A bald-pated man with a long white beard, who squatted cross-legged on the cushions, smiled as if at a secret jest and made a quick suggestion to the chief. That worthy listened, nodded, then sent a sideman off with some whispered instruction. Then he spoke to the hall at large and his henchmen dutifully laughed. A musician began to play on a fretted, triangular *yuke* and a fool juggled and cavorted.

They broke off when the sidemen returned, escorting between them a man in a ragged open vest and trousers of fringed *elik* hide inlaid with priceless shells from the far-off south-west sea. His chest and arms were inscribed with fanciful tattoos. Twin vipers wound up his arms, which were ironbound at the wrists. Leg irons clanked as he shuffled.

Sammi o' th' Eagles regarded the prisoner and then looked at Teodorq's vest and trousers and the tattooed scorpions on each fist.

"Know this guy?" he whispered in the *sprock*.

"Yah. Karakalan sunna Vikeram of clan Serpentine."

Sammi grunted. "Serps the ones trying to kill you, right?"

"Tryin'."

"Good thing he chained up."

The gray-beard on the platform spoke to Karakalan in what must have been the ironmen's language; but he spoke slowly and seemed to use short words. The Serp scowled in concentration.

Karakalan turned to face them and they saw that his nose had been broken and his lip split at some time in the not-too-distant past. He smiled at Teodorq, though the smile must have hurt such an unsuited face.

"Well, well," he said. "If it ain't the little Scorp what ran away like a rabbit when the Serps come for him."

"Hail, sunna Vikeram. Off yer turf, ain't yuh?"

"Hey, rabbit hunting, is all. The headman here—their First—he wantsa know if you're

spyin' for the weenies out in the grass. Now you gotta know it don't matter what you say, cause I'm gonna tell him you are; and then he'll bugger you on the Spit. Just so's you know, sunna Nagarajan."

"I be no *sodbuster* scout," Teodorq said, using the simplest word-forms he could. The eternal tense was for something true now-and-always. "But I understand. You must use these others to slay what you could not."

Teodorq's sentence had been unjust, the tribal elders had been coerced, but the Serps wanted the head that was their due and Teodorq, disinclined to part with it, had struck for the east. The litter of dead Serps in his wake had made his return problematical.

Karakalan shrugged. "Whatever works. Don't matter none to me whether I use a bow, a knife, or an iron chief. Just so's yer as dead as my kid brother."

The First barked a command and the gray-beard spoke again slowly and distinctly to the Serp.

"Scuse me, rabbit. I gotta tell the chief what I want him to think you said." And then he spoke a few short sentences to the man on the high seat, who darkened at hearing them and struck the arm of his chair with his fist.

The graybeard held up a hand and gargled something at his boss; and the First made a disgusted wave with his hand. This was evidently a permission, and the old man again engaged with Karakalan. While they chattered in their slow and halting way, Teodorq glanced at the chief's daughter and saw her watching him with steady concentration. He winked at her, but she did not react.

Karakalan huffed his breath and said to Teodorq, "Baldy here wants to know what-all you learned in your peeking around. So why don't you'n me chat while I figger out what to tell him. Who's yer pet?" He bobbed his head toward Sammi.

"He's a hillman on a walkabout to see World."

"Hey," said Sammi, "Sammi speak for self." He faced Karakalan and jerked a thumb at Teodorq. "What he said."

The Serp snorted. "You gotta smart mouth for a hillman."

Sammi shrugged. "Rest of Sammi not so stupid, either. My butt smarter than some plainsmen."

"Tell me, Kal," said Teodorq, "why do they think I scout for the shortgrassmen? Can't they see that Sammi and me ain't sod-busters?"

"Yeah," Kal answered ruefully. "Me, too."

"I was wondering, seeing how you got those fancy wrist and ankle bangles."

Karakalan jingled his irons. "Threw me a party."

"Looks like they threw you, not the party. They got your sidemen in cages, too?"

The Serp bobbed his head no. "We was ambushed about a league west o' here. Teddy, you ain't never seen what them long swords can do to a man. Murtha's head flew clean off his shoulders. It bounced, Teddy. I swear to all four gods, it bounced."

"Sounds like you could use a friend here."

"Used up all my friends chasing rabbits."

The First growled something impatient. Kal listened, nodded slowly. "If you ain't a scout for the *sodbusters*," he translated, "how come you come outta the grass."

"Sweet breath of Awāchi!" swore Teodorq. "Do those metal hats of theirs cook their brains? Where else could we come from? Anyone and his great aunt Matilda not wishful of either cliff-climbing or being gator-bait has to come past this here spot, and that there's a fact. If their heads weren't iron clean through they'd want to know what I seen in the kraals we passed through. That spy stuff works both ways and . . ." Here, he pointed to the three red stripes he had painted on his arm. ". . . I am a damn subadar o' scouts for the damn *Commonwealth of Suns*. So I know a thing or two about noticing shit."

"Commonwealth of Suns" was a foreign phrase on any tongue. Kal ignored the boast and grinned. "So you *are* a scout. Lemme tell the First."

But the graybeard had jumped to his feet, and turning toward the First, bowed low over his folded hands and let loose a long patter to which his chief listened with irritation passing into dismissal. He clapped his hands to match his graybeard's gesture then bellowed an order. The guards chivvied Teodorq and Sammi in the wake of the departing minister. The chief's daughter, with an amused smirk on her face, handed off her falcon to a huntsman and followed.

* * *

A Snake in the Room.

The *sawak* was a maze. The old man led them through cold stone corridors and up narrow spiral stairwells whose steps were set at irregular heights. Teodorq and Sammi stumbled a few times, eliciting laughs from their escorts. No doubt the twisting and turning was to confuse invaders, but the ironmen had never dealt with Teodorq's people. Plainsmen had a remorseless sense of direction and Teodorq built up a fair mental model of the *sawak* as they wound their way through it.

"Hey," said Sammi in the *sprock*, "Stairs always twist right-handwise going up."

Teodorq grunted. "Ya, these kettle-heads are clever putzes. Attackers forcing their way up can't swing those long swords o' theirs; but defenders coming down can. Between that and the stumbling blocks, this *sawak* of theirs is built to kill attackers."

"Right-hand ones, anyway," said Sammi. "Hillmen smart. Send southpaws."

Finally they entered a warren of rooms filled with a clutter that Teodorq found incredible to contemplate. There was a *gristle-bar* erect, paws open in embrace, an eagle perched wingspread wired to a stout branch. The carpet was the hide of the same striped cat that had graced the shoulders of the *kospathin*. Flowers lifted their fragrances from clay pots. Dried herbs of various sorts filled shelves of glass jars, on which were affixed slips of parchment with runes. On a tall table lay trimmed feathers with blackened points.

As they entered, Teodorq passed near a tree branch and the graybeard said, "Mind the tree-snake. It's poisonous."

Teodorq recoiled from the red-and-yellow serpent wrapped around the branch before he saw that it, too, was stuffed and mounted. The old man chortled. "Yes, I thought you understood the *plavver*. How long did you live among them?"

Teodorq judged dissembling no longer useful. "Bout a year," he said. "We was snowed in during Big Winter and shacked up with Timberlake kraal. That's maybe two weeks easy riding west of Bowman's kraal, across the stony river."

The young woman had perched upon a tall stool. "Why the pretense in the hall of thrones?" she demanded.

Teodorq shrugged. "A man speaks more freely when he thinks none can hear." Then he turned to the graybeard and said in the *sprock*. "Like sunna Vikeram."

The graybeard smiled. "Yes. I had wondered when you used child-talk to deny being a spy."

"Ol' Karakalan is a Serp, which it means he ain't too bright. He learned your talk, but he never figgered that you were learning his."

"You wished I know your countryman dishonest in his translation."

"Sooner we got that outta the way, the better. Karakalan is okay, but he *is* a Serpentine."

"If you don't mind," the graybeard said, "let us continue in *plavver*. I learned some of your sprock, but I fear for now any discussion in that tongue would be too limited. By what name be ye known?"

Teodorq introduced himself and then Sammi. "Sammi here is on what his folk call a walkabout. Me, I had a disagreement with the Serps. They wanted my head, and I still needed it. And what're yer handles?"

That request seemed to surprise the girl, but the old man took no note. He named the girl the Figa Anya Goregovona Herpstonesdoor. The kospathin was her father. The old man called himself Wisdom Sharèe Mikahali Fulenenberk, and he advised the lord.

"And that means I must know all I can about the lands and peoples that you have passed through. Aya kospathin desires I first learn of the sodbusters that occupy our . . . our *fodanny vladenny*. The *plavver* has no word with the proper meaning. It means the lands whose use is entrusted to our kospathin."

"Yeah," said Teodorq. "Funny how often a tribe's home grass already got someone else a-grazing on it. Bowman said this here land been in his clan since creation time."

"That means," the girl said, "since his great-grandfather. Three generations are all they need to say 'thus hath it always been.'" She twisted her mouth to caricature the nasal drone of the shortgrass.

The old man took up one of the feathers and dipped it into a phial to blacken it. "Now, let us begin. What are the distances? Where are the hills and forests and rivers? What prowess at arms have the various folk you have met?"

"Sammi and me come a long way. The telling wants a long time."

Sharèe Mikahali wagged his hand. "Then we may as well start now. Unless you have other plans for the evening . . . ? Tell me of the grassmen west of here."

"So you can compare it with what sunna Vikeram done toldja already."

"Of course."

"Well, Bowman and his crew are fixing to move out west. He's been building carts and wagons and stealing all the horses he can lay hold of. If'n you don't push him, he'll be gone before the Sperm shoots out."

The Wisdom paused, startled, his marking-feather half-raised. "The . . . Sperm?"

"Stupid plainsman means Consort. Enters Sun when in heat. Later Sun give birth."

The old man's eyes brightened. "Ah, you mean the Red Sun!" He scratched the paper briskly with his feather.

"You spilled that readily enough," said the princess. "I mean about Bowman's plans, not your sperm."

"Hey, babe, it's bad cess to the Timberlake folk west of the stony river that Bowman's gonna muscle in on 'em, but it ain't no skin off my nose."

"And what is meant by 'babe'?"

"In the *sprock*, it is a term of respect for important women."

Sammi coughed violently, but Teodorq offered his most winning smile and the princess accepted the translation.

"And if we do push him?" asked the Wisdom quietly.

"Ever seen a kid with a toy what he ain't playing with it, then some other kid comes along and picks it up? Give Bowman his space and he'll beat feet. He knows long run he can't win."

"And the homesteaders he has ambushed and killed?" said princess Anya. "The widows and orphans of his raids? Be they unavenged?"

"Meaning no disrespect, babe, but do you want that land or do you want revenge? All you have to do is wait a little while, and you'll have the dirt cheap. Better yet, let him steal some more horses or lay hold of a couple of your wagons and you'll get rid of him sooner. Can't really blame him for trying to hang onto what was his. Ain't it revenge enough to cut him off from his grandfathers' graves?"

"So, Wiz," said Sammi, "that make your king happy?"

The Wisdom turned to the mountain man, as if surprised to find him there. Sammi had a way of keeping still that allowed him to drift from the consciousness of others. "Our *kospathin* is not a 'king,'" said Sharèe Mikahali. "At least not as the sodbusters reckon kings. 'To every kraal, its king,' they say. But the true king is All Highest Eskandor, the Third of his Name, the Little Father of the North." Both he and the princess traced a sigil with their right hands, and Teodorq squirreled the information away in his memory.

The minds of men leave footprints in their words. If there was a true king, then there was likely a false one; and Teodorq could hazard a guess or two why Eskandor's man had come down off the cliffs to seize the shortgrass. He wondered if other kospaths of this Eskandor could be found in freshly-built *sawaks* along the base of the scarp.

Likely so, he concluded. Something had pushed Eskandor's men off the plateau; though it was surely a long way to jump.

A Door in a Box

"Now," said Sammi. "What second thing?"

When the old man blinked, Teodorq spoke. "Yuh said the first thing your boss wants to know. So the second thing must be something *you* wanna know. And I ken what it is. Yuh surely perked up when I mentioned the Commonwealth of Suns."

A smile parted the Wisdom's beard. "There are no flies on you."

The non sequitur puzzled the plainsman until he realized that it must be a proverb among the iron men. "My saddle is cinched," he agreed, and that, in turn, puzzled the Wisdom.

The Wisdom pulled out a massive stack of parchments all bound together between covers of heavy board. He pulled out a straight razor and scraped the runes off a rugged sheet of parchment. Once the "scrape-paper" was clean enough, he wet his *pen* in the *ink-jar* and poised the feather's point above it. "Yes. The Commonwealth of Suns . . ."

He pronounced the words differently than had Jamly-the-ghost, but it was recognizably the same phrase. And it was just as recognizably a term alien to the iron tongue. The

princess laughed and slapped her thigh like a man would. "Old man," she said, "you chase moonbeams."

But the old man was undisturbed. "I cannot take seriously the protests of one-I-once-dandled-on-my-knee." In the shortgrass *plavver* they were using, that was a single term. "Tell me, O Teodorq, how does one become a scout for the great band of stars?"

Teodorq cocked his head. "The great band of stars?"

"The swath of white that crosses the sky during the nightless Little Winter resolves into a myriad of individual stars when viewed through a special glass. In ancient times it was called 'the commonwealth of suns,' and still is by our liturgical language."

"Hillmen," said Sammi, "call it the Lactation, which means the milk from the breast of the Mother."

"And on the Great Grass," Teodorq added, "we call it the Treasure Fleet. Each of the individual stars in front is a Rider carrying a torch through the Great Night and behind them is a great heap of gems and golden beads they are bringing to World."

The Wisdom grunted. "Fleet?"

Teodorq shrugged. "I always figgered it meant a 'heap' or 'hoard.'"

"So what do your people mean when they say 'Commonwealth of Suns'?"

"We don't. I never heard of it before Sammi and me met Jamly-the-ghost."

Teodorq saw no harm in recounting the tale, in which he thought he came off rather well, and so he told how he and Sammi had independently discovered the ruins of *Shuttle Starbright-17* out in the western marches of the shortgrass prairie.

"Except stupid plainsman find place by accident," said Sammi, "while I hear sodbuster stories, track it down."

Teodorq ignored the jibe. "It matters not how a man may come to a place. What matters is how he leaves it. The *shuttle* was a house within a hill. It had come to grief so long ago that the soil and grass grew thick on its back and sides and only through a narrow cleft could a brave man gain access." He paused and added, "Being the braver man, I went first inside."

Sammi added, "Being smarter man, I let him." The princess laughed.

"Someone must go first of all," Teodorq said, "and best that man be one that others would follow. Inside, we found all a ruin. Dust layered thick on the floors; plants and creeping things encroached within, and among them lay the scattered bones of those who had gone before us. But did Teodorq sunna Nagarajan turn back?"

"Not when Sammi of Eagle-clan stand behind, blocking way."

"Very strange was that house-within-the-hill. Passages led forward, led right, led left; *and even led up and down*, as if a man might stride level in every direction. Then, seeing the bravery of Teodorq and his stalwart companion, the headman of the *shuttle* summoned them to her council chamber. This was Jamly-the-ghost."

"Ghosts," said the princess, "are more talked of than seen."

"Duh," said Teodorq, "they're invisible? But Jamly, as I came to understand, was somehow a portrait. Ay! What man may understand how a drawing might move or speak? Even Teodorq sunna Nagarajan the Ironhand does not know this, but rests content that this one drawing did so. Jamly then recounted old deeds. She told how the countless sky-wagons called the *Treasure Fleet* came to World and founded the great villages of Iabran and Varucciyamen—which, by the way, do you know where them places are?"

The graybeard shook his head. "The names are unknown to me."

The princess said, "Faerie tales."

Teodorq inclined his head. "Yuh may be right, babe, for Jamly appeared, floated in the air, and disappeared. A faerie tale told by an old wet nurse may be disregarded; but a faerie tale told by a genuine faerie carries some weight."

"Now, in the course of building their villages, the starmen were discovered and attacked by their great enemy, the People of Sand and Iron. In the battle that followed, the starmen were victorious, but their wagons were destroyed and *Shuttle Starbright-17* fell to earth, killing all aboard save Jamly-the-ghost."

"Ghosts already dead," Sammi pointed out. "Can't die twice."

Teodorq shrugged. "As may be. Jamly has awaited succor from her people for more

years than a man may count even with a pebble jar. Concluding that her comrades knew not where she lay, being covered by earth and grass and all, she made me and Sammi 'authorized personnel' and told us to find the starman villages."

The Wisdom glanced up reflectively. "So Jamly's 'Commonwealth of Suns' is . . . ?"

"A league of many villages that exists somehow above our heads in the great band of light. The chief of them is a village called Terra."

"When a man dies, we say he has 'gone home to Tra.' I wonder if this 'Terra' is another name for the Abode of the Dead."

"Jamly swore us a mighty oath to defend the Commonwealth against 'all enemies, human and inhuman.' This is why the son of Nagarajan wears the three red stripes on his arm, and Sammi the two."

"Uncle," said the Princess Anya. "Human and *inhuman*?"

"I heard. Perhaps these men have been sent to us by the Doom."

Sammi mutter *sotto voce*, "That can't be good." Teodorq ignored him.

The Wisdom rose and beckoned them. "There is something I would show you. It is a holy object anciently possessed by House Tiger and sacred, so it is said, to the Commonwealth of Suns."

Wisdom Mikahali led them through another labyrinthine passage into a fane lit with blue flames enclosed in glass bowls. The walls were hung with the likenesses of men in the robes of the kospathin. His ancestors, perhaps. As Teodorq walked up the center of the fane, the eyes of the old Firsts followed him. Ayii! The plainsman flinched from the eldritch magic. What could be so precious that such men stood watch over it? But as he studied them more closely he saw that the likenesses were a mock made of smears of colored pastes and he let his breath out. That the eyes seemed to move was startling, but only a clever art. Jamly had moved, too; and he thought now that it had been through a similar though more potent artistry. The ironmen could make eyes seem to move by daubing colors on a curved surface; the starmen could make whole bodies move . . . and talk . . . and float through the air . . . so, a *lot* more potent

... but perhaps magic was after all only a sufficiently clever art.

A bald man in a floor-length robe entered the fane. His face was painted, though decoratively rather than as for war. His eyes were outlined in black and his lips glossed in red. Gold draped his neck and hung from his ears. His head alone would be a substantial prize to take. He spoke the *yashiq* iron-talk in a soft melodious voice and Teodorq, who by now could follow simple sentences, heard him say, "What wouldst thou here, Wisdom?"

"*Tsadaràsity*, Sharèe Thawèteri. May the light of the Commonwealth shine on your nights."

The shaman was unimpressed. "Thou followest new gods, Sharèe Mikahali. Why comest thou to call upon the true ones?"

In *plavver*, the Princess Anya explained to Teodorq and Sammi that her uncle, like most educated ironmen of the past three generations, followed the One who sustained World, and therefore he regarded the Great Band as merely another created thing, composed of fires like Sun. Sharèe Thawèteri on the other hand regarded the Great Band as the gods themselves keeping watch over World.

"We would gaze upon the Relics," the Wisdom explained.

"The Relics," Sharèe Thawèteri answered, "are not for profane eyes." Teodorq thought that the painted man had no testicles and wondered what enemy or accident had deprived him of his descendants.

The shaman seemed inclined to resist indefinitely, but the princess coughed gently and the unman cast her a cautious glance.

"Perhaps my father could resolve the matter," Anya suggested.

It seemed to Teodorq that Anya's father could resolve matters without ever putting in an appearance, for the shaman hurried to obey. With a golden key that hung about his neck, he unlocked a tall, rosewood cabinet, swinging each door wide to display the Relic within. "You may not touch it," said Thawèteri, "but you may kneel and kiss it."

The Wisdom and the princess seemed disinclined to honor the Relic, but neither did they defy the shaman. They merely nodded to the cabinet, inviting the western men's regard.

The Relic was a flat, rectangular panel bearing four sets of runes.



Sammi stepped forward and kissed it. Teodorq wondered at this sudden fit of devotion, but when Sammi rose again, he announced, "Same *esramig* as *shuttle*. Taste same, feel same, smell same. Rap with knuckles, maybe sound same." He glanced at the shaman, who showed no inclination to permit that. But when Sammi concluded, "This come down from sky, like shuttle," the man smiled as if he had brought it down himself.

"So, it is truly made of skystuff," the shaman whispered.

Teodorq slapped Sammi on the arm. "Hey! It's one of them sliding doors, like we seen in the shuttle."

All of them, the shaman included, stared at the Relic, as if waiting for it to slide. But it remained stubbornly stationary.

"A man's arm don't wave," Teodorq suggested, "after it's been hacked off his body. So maybe the door don't slide when it's been taken from the shuttle."

"Needs Jamly-the-ghost," Sammi concluded. "Ghost moves body. Jamly moves shuttle."

The four lines of runes were so different in style that Teodorq judged them the runes of four different peoples, much as the all-prairie signs used on the Great Grass differed from the sigils used by the Hillmen or the angular runes employed by the ironmen. Strangest was the sigil that appeared to show the lesser moon rising over a range of hills with two parallel rivers flowing away from their base.

"Have you seen the like of these inscriptions before?" the Wisdom asked them.

Teodorq nodded. "I saw many inscriptions

like the first in the shuttle. None like the second. A few like the third and fourth." Sammi said nothing but grunted his agreement.

"Maybe this is a part of your shuttle and your Jamly wants you to bring it back to make the repair."

The shaman sucked his breath in horror, but Teodorq said, "Jamly tells of many ships and shuttles. I 'spect there are lots of pieces scattered about, from many vessels."

The Wisdom shook his head sadly. "There is so much we do not know."

The shaman meanwhile had brought out of a tabernacle a smaller panel in a golden reliquary. It shone with a dull light, much as the panels on the shuttle had. But this was filled with lines of the curly runes.

"It is like a page from a manuscript codex," said the Wisdom, "but it is neither parchment, nor vellum, and the ink will not smudge. In all the generations House Tiger has possessed it, that page has neither faded nor grown brittle. Each time it has been displayed, the lines have changed. Yet, there is only this one page. One page that is somehow at the same time many pages. And no man knows the art of reading it."

The shaman replaced the Page in its tabernacle and returned to the Door. "I wonder where it once led. Somewhere wonderful. To the heavens, I am sure."

In a peculiar flash, Teodorq wondered if the unbalanced man might not be right. But he thought the Page might be more wonderful still, should a man ever decipher its runes.

A Chip Off The Block.

A few days later, the Wisdom had them summoned to his quarters, where he and the princess again awaited them. Clapping his hands, the Wisdom summoned a servant to bring a tray of fruits and dried vegetables which could be dipped into a variety of sauces using short skewers. Teodorq and Sammi exchanged glances. There had definitely been an upgrade in their status.

"I take it me and Kal gave you straight skinny about Bowman," Teodorq ventured.

The Wisdom fingered his beard. "His assessment of the sodbusters was as you have said. Our legionnaires tell us they are busy fleeing from our might."

"Cowards," said Princess Anya. "They do

not stand and fight, but strike by night and ambush."

"Wise people," suggested Sammi.

When he did not elaborate, the Wisdom and Princess looked to Teodorq, who explained. "A man fights from his own strengths, not from his enemy's."

"Fight from ambush, maybe run away, fight again later," agreed Sammi. "One time whole plains tribe—not Teddy tribe but up north—come to hill country because we find poor little lost cows and take home to care for them. They get all their friends to come thank us for taking such good care, but in Ganesha's Gorge all rocks come tumble down, make big cairn overtop them."

The Wisdom gaped at him and Anya stared in horror. "You threw boulders *on warriors*? From the hilltops?"

"Best place throw boulders from."

"That is not how an honorable man fights!"

"That what you call him, 'honorable'? Our word 'dead.' Mean same thing?"

The Wisdom turned to Teodorq. "What of your countryman? Is he also a fell fighter?"

"Kal? Maybe the best in the Serpentine clan, which means any Scorpion can beat him, but . . . Sure. Your guys fought him. What did they say?"

"He tried to deceive our prince. What should we do with him?"

Teodorq placed his hands together, though he did not bow over them. "Could you ask yer boss not to do Kal no permanent damage, like sitting him on top of that Spit?" More than the iron shirts and swords, that cruel method of execution drove home to Teo the alien nature of the people he had found himself among. A keen knife across the throat was far more merciful. *If it were done*, the Lore commanded, *best that it be done quickly*.

The chief minister cocked his head and stopped working his beard. "You surprise me, westerman. I thought he wanted to kill you!"

"Sure. But I don't hold it against him. I killed his brother, and I'm responsible for another brother getting himself killed. Hard to get kissy-face after that."

The princess spoke up. "Then why ask my father's mercy for him?"

"Y'see, it's like this," Teodorq explained. "Kal and me, we *gotta* fight. The singers

won't have it no other way. And I don't want it sung that when the time come I had an unfair advantage, like he was dead or maybe walkin' funny. It ain't good art. Kal, he's a hero. He kept up a stalk cross half of World and all the way practically to the edge. So he ain't no weenie, even if it was half dumb luck we crossed paths. And me . . . Well, I am Teodorq sunna Nagarajan the Ironhand and modesty prevents me from numbering my stunts. But a final stunt needs two foes even-matched. It ain't too much to ask—and might be more entertaining.”

The Wisdom gave that some thought. “If our kospathin does as you ask, plainsman, you could die.”

“Hell, Wiz, everybody dies. Only question is whether anyone sings about it afterward.”

The Wisdom tugged on his beard. “Maybe your kind would fight well against the greens.”

The three westerners were put in the charge of Yar Yoodavig, the son of a swamper who had come north to Cliffside Keep years before. The yar—for it was a title and not a name—managed to conceal his deep delight at being given their care, and showed this in the tenderness with which he taught them.

“This here’s the kospathin’s Foreign Legion,” he told the new recruits, who in addition included a shortgrasser named Hidaq Upperbrook, on the run from someone’s husband, and the swamper P. Z. Emersavig. “Whatever you were before, makes no never mind,” the yar said. “Whoever you were before don’t matter none. Why you come here to Cliffside Keep, we don’t give a crap. This here’s a clean slate. Only matters if you can ride well and fight like a daemon.”

“Made in the shade,” whispered Kal to Teo. It was whispered under his breath and barely audible, but the yar heard him and sent Kal on a run around the training field. The men standing guard on the walls laughed, but none of the veterans in the compound cracked a smile.

“We gotta break you down into little pieces,” the yar explained, “so we can put you back together the way we want. This is the meanest, toughest company in the kospathin’s service and . . .”

Teodorq raised his hand, and the yar

stopped his harangue and stared at him. “You gotta question, savage?”

“When do me and Kal get to fight?”

The yar looked as if he had sipped vinegar. “You in some kind of hurry? Soon as you learn how. If you’re gonna entertain the high and mighty you gotta know how to put on a decent show.”

“What I mean,” Teo said, “is that Kal’s gonna be a little winded when he gets back, and I don’t want it sung that I had unfair advantage.”

The yar showed his teeth. “That can be fixed.” And he sent Teo on a run around the grounds in Kal’s wake.

They trained at swordplay—at first with stout wooden rods against posts, then against Yoodavig himself, and many were the welts that Teodorq wore back to the barracks. The purpose of the long drills was what the yar called “muscle memory.”

“The last thing you got time for in a battle,” he told the trainees, “is for thinking about *how* to fight. Your body got to know how to do that without any help. Your mind . . .” And he thumped Emersavig’s skull with a thick forefinger for emphasis. “. . . assuming you got one, is for strategy and tactics, listening for orders, watching for banners, and all the rest of our craft.”

They learned the parts of the long sword—the supple fore-blade, sharp but easily cleared, and the stout aft-blade, on which an opponent’s stroke might be caught; the lower edge for cutting or hacking on the forehand service and the upper edge for doing so on the backhand. The blades were amazingly light for their length, which was about an arm’s reach, and Teodorq spent much time with the smith watching how they were made in a special furnace blasted with air from a bellows. The ironmen called this kind of iron *stall*, a word that meant “stubborn” in the *sprock*.

They learned the various guards and attacks, and how to dance seamlessly from one to another. They learned when to “go hard on the sword” and when to go soft; how to stab and hack and cut, and how to get out of a bind. And how to use the off-hand on the pommel for extra leverage.

It was every bit as nuanced as knife fight-

ing and wrassling, which every plainsman sucked up with his mother's milk.

"Too complicated," Sammi complained one day, carefully outside the yar's hearing. He counted on his fingers. "Spring from ambush, slit throat, run away. Much simpler. Not so much to learn."

But nowhere in the practice yard was outside the yar's hearing. "There's no hiding on a killing field, stupid hillman!" he gently informed Sammi. "How you plan to spring from ambush on an open meadow?"

"Easy," Sammi replied. "Not fight in open meadow. Ambush best in dark, crowded place."

He won four laps around the practice field for that one—in helmet and breast-and-back.

World was a bigger place than Teodorq had ever imagined. World had always been the Great Grass, rolling off as far as the eye could see. The hill country to the west and the distant plateau to the north had only served to mark the boundaries; the center had remained the limitless prairies. There, great events had taken place. The rivalry of the Scorpion and Serpentine clans. The Great Trek West of the Gudawan Adyawan at the dawn of time. The war with the Pheasants and their allies when the hero Bardremow sunna Iyash had declared himself First-of-all-Firsts and tried to bring all the Great Grass under him, and bows had sung from the foothills to the Breaks.

But he had learned since leaving home that that had been only one small corner of world, and people elsewhere had never heard of any of these portentous events. Every people thought themselves at the center of World, and never was it actually so. Events of which no plainsman had ever heard—the war among the ironmen, the descent from the great plateau, the chivvying west of the short-grassmen—would echo and redound on the Folk of the Great Grass. And even here, among so puissant a people as the iron men, events beyond their horizon had sent greenies to torment them.

In the barracks, Sammi spoke to Teodorq privately while the two of them cleaned and sharpened their blades. "Hey, stupid plainsman. Why you watch Kal so close during

works out?"

Teo looked about the barracks, saw Kal at the far end with the other recruits and the gaming dice. He ran the whetstone along the upper edge. "You know what the yar says. 'Eyes on the enemy.' 'Fight the opponent not the sword!'"

"Plus profanity. Sammi hear him say it."

"Well, every man thinks different," Teo told the hillman. "So every man fights different. The best place to beat a man is in his own mind. I need to know how Kal fights, get into his head. Which I grant you is tight quarters. You notice how he likes to swing his sword with *both* hands? Bad habit. The follow-through on that stunt leaves his right side exposed, which he ain't got no guard."

"Yeah?" said Sammi. He finished cleaning his weapon, returned it to his scabbard, and hung it on the rack. "Well, case you not notice, Kal studies Teddy real good, too. What bad habits you got?"

Teodorq could handle the swords more nimbly than even some of the more experienced legionnaires, who prior to coming to Cliffside Keep had known only bows or pikes. But Teodorq was accustomed to knife fights, and this was only a longer, sharper knife. He began to add knife tactics to his swordplay when Kal was not around.

Now and then, the princess would come down from the Keep to watch the men at practice, sometimes with the Wisdom, but other times with only her women as escort. There was a set of raised benches from which others might watch the yard, and she usually sat in the center of the lowest tier, chin cupped in both her hands. Teodorq always tried to put on a good showing when the princess was watching. In one mock combat against the wooden fencing post, he managed to land his blows in such a way as to carve out a tolerable face from the grain of the wood.

"Show-off," Kal muttered.

"She comes to see Sammi," the hillman explained in barracks that evening. Hidaq and P. Z. expressed skepticism. "Why you?" Hidaq asked.

"Sammi prettiest man in Cliffside." He said this with the air of one stating the patently obvious.

"They must have some mighty ugly men

here, then," Kal answered.

Sammi looked around the barrack room and spread his hands as if his point had been proven.

Teodorq snorted derision. It seemed to him that the princess looked on the men as a trader at the Horse Fair looks upon a new remuda of stallions. Any time, he expected, she would come down from the viewing benches and check out at their teeth and inspect the soles of their feet.

And maybe take one of them out for a ride.

"When you think they gonna let us outside the fort?" Kal asked.

Teodorq looked up in surprise from his needlework. He had been repairing his vest. "They keeping us in?"

Kal blinked and cocked his head. "I see yer point, Rabbit. You an' me, and even yer hillman here, could leave anytime we wanted to. But they probably think the guards and the walls are enough to stop deserters."

The hillman smiled. "Sammi getting three meals and exercise, so no rush. Bide time. Consider options."

A Point of a Sword

Because the Legion was primarily a scouting force, they trained on horseback as well, and here Teo and Kal excelled from the start, since they had been very nearly born in the saddle. Although the horses were larger and clumsier than their own prairie ponies, and both plainsmen were accustomed to fighting with the compound bow, they learned to swing their longswords from horseback without nicking their own mounts. Hidaq also performed adequately, but both Sammi and the swamper were learning new skills.

One day, the yar came onto the practice field and counted only four recruits. "Where the hell's Sam Eagle?" he demanded. "He shirking?"

P. Z. looked around the meadow. "He was here just a while ago."

The yar crossed his arms and glared at them. "He better put in an appearance real soon now."

The grass at his feet rustled and seemed to come alive, and Sammi rose and held the point of his knife to the yar's throat. He had decked his jerkin and trousers with grasses so that he had blended in with the ground.

The yar didn't blink. "Good camo job, Sammi. You're in the point guards, starting tomorrow. Report to Thewëhdarosh."

"Good. What point guards do?"

"They go out ahead of the Legion and scout things out."

"Not so good."

"And Sammi? Five laps."

The recruits were issued their own swords at a ceremony attended by those of the Legion not out on sweep or garrison duty. Teodorq decided to call his sword *Lifesaver*. Kal called his *Rabbit-killer*. Sammi only shook his head. Hillmen did not name their weapons.

"Maybe tomorrow," said Kal off-handedly while the shaman sprinkled the recruits with a sprig of holly dipped in water. "Maybe tomorrow they let us kill you."

"Us?"

The five recruits stood in a row with their swords in fool's guard, points straight down resting on the ground in front of them. Kal stroked the haft of his sword. "Me and my friend, here."

"Maybe," Teodorq answered. "But yuh gotta know these ironmen here are spreadin' west. Old Wiz, he been asking you questions about the Great Grass, ain't he?"

Kal spat on the ground. "Yeah, them sodbusters won't be much to stop 'em. What about it?"

"Think somebody oughta tell the Gudawan Adyawan?" He meant the tribe to which both the Serps and his own Scorpions belonged. "All the clans gotta work together if these kettieheads come west."

"I'll tell 'em ya said so when I see 'em, bein' they's yer last words an' all."

"Just saying, sunna Vikeram. Remember, there's one song finer even than the two heroes who finally fight."

Kal frowned. "Yeah? I wouldn't count on it, was I you." He swung his sword straight up in salute and Teodorq tensed, just a little. Kal laughed and Teodorq remembered he was supposed to do the same as part of the ceremony. Kal kissed his blade.

"Don't you agree, Rabbit-killer?"

With the rest of the Legion, they practiced turning their horses from single file into

columns of four and into line of battle. Apparently, all ironmen fought by lining up and charging at the enemy in unison, yelling *lulu-lu!* and swinging their swords. The kettle heads used a long pointy stick, but the legionnaires were more lightly armed. "Speed, not weight, is our advantage," the yar explained. "Let the pots and pans crash together. Our job is to ride far and fast, find and harass the enemy, and bring back word to the battle line. Light cavalry, heavy cavalry. Each has a job to do."

It was during one of these practice skirmishes that Kal decided he had waited long enough. Teo and the Serp had been placed in opposing lines and as the two lines closed, Kal and his mount shouldered aside his neighbor. This opened a hole in his own line, but it put him directly facing Teodorq sunna Nagarajan the Ironhand.

They were supposed to be using the wooden practice swords, since the objective of the session was tactics, but Kal had unsheathed Rabbit-killer and swung it at Teo as they closed.

Teo leaned back flat against his mount's withers—an old prairie stunt—and the blade whistled by harmlessly. That gave him a chance to rein, turn, and pull Lifesaver from over his shoulder all in one smooth motion. Teodorq assessed his situation while Kal completed his own turn. The sun was in the west, which meant the light would be in his eyes when he and Kal closed. The terrain in the meadow was flat but undulated and Kal's first pass had placed him not only with the sun to his back, but on the higher ground.

"Didn't think you had the smarts, sunna Vikeram," he called out.

Kal was brave, skilled, but prone to the reckless, so Teodorq fell to considering how he might turn that to his advantage. At some point, he was certain, Kal would swing double-handed as hard as he could and open himself to a counterstroke. Assuming that Teo could dodge that first stroke.

The other legionnaires had pulled up on the flanks and were watching with varying degrees of professional interest. Some were shouting encouragements to one combatant or the other. Others were taking bets. Sammi was waiting for some sign and had pulled his boot-dagger from its sheath. But no man

wants his deeds sung as treachery, so Teodorq shook his head and Sammi reholstered the knife.

At that point, Yar Yoodavig rode between the combatants with his own longsword on sky guard. He pulled up hard on the reins and shouted. "All right! You two savages been aching for a fight since they first give you to me. Now I hate to put all that training into a man only to see it go down the outhouse, but the kospathin said to allow it, so you have it to do. But you owe the boss-man this much. Wait till he gets here so he can watch." He turned, checked rein, and turned back. "And get off my damned horses! I may got to lose one or both of you, but trained warhorses are hard to come by."

Teodorq slid easily off his mount and Kal, seeing his initial surprise attack had failed, did likewise. A slap on the rump sent both horses trotting off the field, and the two men faced one another on foot. Kal held his sword "shoulder arms," both hands gripping the handle, the flat resting against his right shoulder.

Shortly, the party from the Keep filed into the observers' benches. Someone laid down pillows for them to sit on and draped the Tiger banner over the banister. The kospathin sat in the center, flanked by his daughter and his Wisdom, with the other courtiers spread around them. The Wisdom scowled, whispered to his prince, but received a vigorous shake of the head. Teo suspected the advisor wanted to stop the fight.

Teodorq sighed. He had it to do, and that was for sure. He stood with his sword point down, resting on the ground in fool's guard. He was apparently not on-guard at all, but from this position, he could transition swiftly to any number of other stances. He expected a more straightforward attack from Kal, but hoped he would put on a show good enough to satisfy the First.

The argument between the prince and his Wisdom concluded and the princess waved a white banner to signal the start of the duel. Sometimes, Teo thought that she was the most bloodthirsty of the lot.

Kal, as expected, rushed forward with his sword held in the "batter's stance"—the hilt gripped in both hands with the blade over his right shoulder, ready to swing into a hack or a

slice as opportunity presented. Teodorq waited unmoving until his foe was three arms-length's away, then he swung lifesaver up into "the bull," holding the hilt beside his head with his left arm crossed over, ready to push the pommel. This aimed the point of the sword at Kal's face and blocked the downward motion of Rabbit-killer on the aft part of the blade. Kal, disinclined to impale himself, checked his rush, spun to Teodorq's left, and disengaged.

Kal held his sword in "plow," arm extended from the waist. Teodorq stepped forward, brushed the fore aside and thrust in long-point. Kal retreated again, but spun and threw an understrike, which Teo parried with an "iron pinwheel." Both he and Kal reset the combat.

"You ain't as easy as I thought you'd be," said Kal.

Teodorq grinned. "Hadn't planned to be."

Kal rushed him with several hacks from the left and right, but Teo voided them and shifted guards. He stepped out in the batter's stance, made a right passing step forward and settled the blade onto his upper right arm as he turned his body into a left "augur." From there, he lifted the hilt up, over, and behind his head to settle into a left-handed batter; then took a left passing step backwards, settling the blade on his left arm in a right augur as he turned. Kal blinked, unsure of how to attack, swung an overhand hack that Teo easily parried, then voided the battle space.

The two circled each other clockwise, swords held one-handed to the side in long-point. Teo waited his chance then dashed across the circle with a wide sweeping cut. Kal blocked it with a cross strike, as expected, but Teo spun about and stood on the high ground with his back to the sun and his sword held in "sky guard" beside his head. Kal faked a rush, but Teo did not strike and the Serp took a step back.

Each time Kal stepped into Teo's shadow, Teo shifted to put the sun back in his opponent's eyes. He wasted no time feeling sorry for the Serp. Kal had woken up that morning looking for trouble and had no complaints now that he had found it.

They danced a few more passages, their feet skating as if on water. They would close, exchange three or four blows, then void the

battle space. Now and then, voices arose from those watching from the viewing benches, commenting on this stroke or that guard, but Teo paid them no mind. Something more dramatic was needed than the moves they had learned from the yar if they were going to impress the kospathin.

Teo swung in a horizontal slice and made a complete pirouette throwing a second stroke as he came around. Such moves were dramatic, but dangerous. One should never present one's back to a man with a long sharp sword.

But Kal had dropped into a three-point, like a runner poised for the signal, and the blade passed harmlessly over his head. He sprang, sword extended in longpoint, and Teo backed out barely in time.

Finally, Kal said, "Screw this shit," and charged with his sword to the sky. Teo had been waiting for this and took the blow on his aft with a Bull Guard. Kal went hard on the sword and Teo found himself in a bind. He swung Kal's fore out of line and twisted into a cut with the back edge of his sword, drawing first blood.

This time, Kal did not back off, but swung from the opposite quarter and again put Teo in a bind. This time, Teo reached out and grabbed both swords by the blade at the point where they crossed, pulling hard and prying Rabbit-killer from an astonished Kal's hand. Because they had bound swords at the aft, the blades did not cut through Teo's thick leather gloves.

Kal dropped to his knee and pulled a quillon dagger from his boot scabbard. He used the crossguard to catch Teo's stroke—and paused.

For Teodorq had pulled his stroke.

"So," Kal said. "Ya want it like that?"

Teo smiled. "There's one song better than the two heroes who meet. Why can't we let them sing it?"

"You ready to take that chance?"

In answer, Teo tossed both swords aside and pulled his own dagger from his boot.

"That's more like it," Kal said with a grin. "This is how two plainsmen fight. Face to face, close quarters." He paused again, then said, "I mean to avenge Chelwy. Blood for blood."

Teo spread his arms. "He came on me too sudden. He had cast aside his scabbard."

"Yeah, Chelwy was an obnoxious little twerp, but he was my kid brother. You know how that goes. Did he die well?"

Teo remembered that Chelwy had died screaming and soiling himself. When he had tried to ambush Teo, he had never imagined himself as the slain. The last look on his face when the knife slid in had been one of vast surprise.

"He fought well for a man so young," Teo lied. "Had he not pressed me so hard, I might not have had to kill him." In truth it had been Teo's own surprise and anger at being attacked and his own loss of control that had led to the slaying; but there was no point in confusing Kal with such details.

"He never knew how to listen," Kal said. "Now he ain't listening to anyone anymore." Kal charged suddenly and Teo crouched into a dancer's crouch, spinning on his left leg and scything with his right. Kal fell and Teo leapt atop him. They seized each other's knife hand by the wrists.

Kal threw a leg straddle and the two rolled across the grass flailing. The watching legionnaires gathered round in a circle shouting encouragement to both fighters until a call from the herald bade them open up for the First's view.

"Blood for blood," whispered Kal. "Ya know what I gotta do."

Teo had entwined his legs with Kal's so that the two of them seemed almost a single organism. He nodded and relaxed his grip on Kal's knife arm slightly. The blade touched his shoulder and ran like a line of fire down his arm. The blood ran hot.

"Break," he said to Kal; but Kal hesitated. A deeper slice would cut Teo's bicep, maiming him. It was a sore temptation to a weak man.

Teo led him not into temptation by executing a shrug-and-roll, escaping from the hold and whipping his knife to Kal's throat simultaneously with Kal's mirror move.

"Well, now, Rabbit," said the Serp. "Looks like a tie."

The next day, Teodorq and Kal, along with Sammi o' th' Eagles, were brought into the great hall before the kopathin. The prince spoke in the ironman *yashiq* and the Wisdom translated not only into *plavver* but also into a passable *sprock*.

"He's pretty sharp for an old man," Kal said under his breath. "Still gripes me how he was picking up the *sprock* while he was teaching me *bo-yashiq*."

A tall yellow-haired man with pale eyes struck the floor with his staff and said something Wisdom Sharëe Mikahali translated as, "Hear now the justice of Aya Herpstone, kopathin of Cliffside Keep."

"Proverbial is his justice," cried the sidemen lining the hall. Teodorq suspected that anyone disagreeing with that proverb had long-since ceased to line the hall, but the cry had a ceremonial sound to it, like when the shamans sang upon the ancestors and the Folk responded with ancient lines.

"Be it known that in a display of skill and bravery, the Men of the West have engaged in a fight to the death . . ."

"Hey," muttered Sammi. "Leave me out of it."

" . . . And while We of Cliffside Keep admire such pointless bravery, the offense over which they quarrel touches not on the honor of Cliffside Keep, House Tiger, or the Little Father of the North, and therefore We declare it null, void, and of no merit within Our holdings or those of the Little Father and his other children. We take all such offense on Our own head in mercy, and will regard any further attempt by Karakalan Vikeramof or Theodore Nagaramof to strike at one another, either directly or through such an intermediary as Sam Iggleston, as an offense against Our Mercy and against Our Own Person, to be punished as dogs are, at one grade above the Spike."

Teodorq wondered if that was one grade better or worse than being impaled and decided that it was better not to ask. The lord evidently had other fates in mind for them than mere entertainment. He regarded Kal and Sammi from the corners of his eyes. The Serp glowered; Sammi seemed thoughtful.

"Further, given that they have revealed themselves as fell fighters, it is Our desire that these three men be enrolled in our Foreign Legion and sent to scout Our enemies."

It was a subtle move, a mere flick of the eyes, but the First glanced toward the Wisdom when he said that, and that was when Teodorq decided who the real chieftain of Cliffside Keep was. The kopathin was to all

appearance himself a fell fighter. His muscles came from swinging that long sword from horseback; and his scars proved he did it well, for they were bold enough that anyone less expert would have died in the fight that won them. But the clever mind rules the hale body and, as the bowmaster calls the shots on a hunt, the chief minister aimed his lord at targets that he chose.

After the speech, they were walked through a fearsome oath calling upon numerous gods whose natures were unclear but whose threatened retributions were not. Even Kal went a little pale at the penalties foretold. They were, after all, on these gods' turf.

Teodorq compared the oath to the one Jamly-the-ghost had given them in the name of the Commonwealth of Suns. There had been a threat behind them too, given that he and Sammi had been "unauthorized personnel," but the words had been higher and prouder and had not been stuffed with such dire warnings as to suggest mistrust. This alone told him much of the ways of the ironmen. Despite their talk of honor, oathbreakers must be common enough among them to warrant such sureties.

Sammi grumbled. "Too many oath," he said. "Soon one oath break another."

"Dontcha worry, Rabbit," Kal told Teodorq that night in barracks. "I given my word, and a Serp keeps his words. But I gotta worse problem now."

"What's that?" asked Sammi o' th' Eagles as he stashed his kit under his bed and pulled the blankets off, for he preferred to lie on the floor. *Soft bed make soft man*, he had explained.

"The First took Rabbit's crime on his own head. You heard it. Now I gotta kill the First. Ain't that a kick in the butt."

Sammi grinned. "You get more in butt than kick, you try it."

Teodorq told Sammi it would be hard to search out labran and Varucciyamen if they were stuck at Cliffside Keep. But he was pretty sure the starfolk's encampments did not lie back west and, while he did not doubt his ability to escape his captors even on unfamiliar ground, a good scout knew better than to dash headlong into unknown territory. There were other ways to learn how the land lay.

Kal said, "So they're sending us to fight greens? I heard they fight with thunder and lightning."

Teodorq sat on the edge of his bunk. *"That can't be good."*

Sammi said, "We no hear of greens on the short grass."

Teodorq smiled and crossed his legs at the ankles, coupled his hands behind his head. "Which means they're somewhere east of here. So it's just as well. We was going that way anyhow."

Teodorq sunna Nagarajan did not believe that there was any longer a Commonwealth of Suns or that their commission meant anything; but he continued to paint the stripes across his biceps and would ask after the two starman towns whenever he encountered other men. ■

(EDITOR'S NOTE: Teodorq sunna Nagarajan the Ironband and Sammi o' th' Eagles have appeared previously in "The Journeyman: On the Short-Grass Prairie" [October 2012].)

The Region of Jennifer

Tony Ballantyne

The region of Jennifer extended to about thirty kilometers. Out there, amongst the decaying factory belt, daffodils pushed their heads through the tired earth of the canal banks.

The Steam Barons may have lost their power, but the world still bore their scars. Even so, Jennifer was at work to make things beautiful. At twenty kilometers, shining fields of buttercups lapped the slag heaps. At ten kilometers there were avenues of laburnum, the strings of yellow flowers drooping over rusting railway lines. At one kilometer the fields gave way to green lawns as smooth as a billiards table. A team of gardeners labored constantly to unstitch the Abraxan threadweed that wriggled blindly up from deep below ground. Gardeners pruned the fruit trees, they collected the oranges and peaches into baskets to be stacked in the cool rooms by the kitchens of Jennifer's house.

The house was the stationary heart of the region of Jennifer. The maid would open the front door in her yellow dress and white pinafore and show guests into a reception room striped with yellow and white wallpaper where they would be served pale golden earl grey tea. Usually, Jennifer would come down to meet them, but a very fortunate few

would be ushered upstairs to her private rooms.

Jennifer's rooms were painted in yellow and gold. They were decorated with gifts brought from around the Universe: diamond casts from the ice caves of Lithium; living gold leaf from Aral 9. Jennifer would sit on the brocade sofa in the center of the room wearing a simple white dress over a silk slip. Beneath the slip, silk underwear, a hand stitched brassiere, silk knickers. And beneath the silk knickers, the reason for all of this extravagance.

That was Jennifer, life support system for a womb. A womb that, in eight days time, was due to receive its first passenger.

But not if Randy had anything to do with it.

Randy's life had taken a very different direction to Jennifer's. There was no region of Randy. Randy was the region of Randy in its entirety. Randy had no home: he had been re-engineered that way. His skin was thick and leathery, so well insulated that he could sleep in the pools of cold water that filled the broken basements of the broken factories in the former industrial zone. When the outsiders had come to Abraxas and bankrupted the Steam Barons, Randy's re-engineering decision looked to have been the smart choice. As the

economy collapsed across the planet, as the work dried up and the bread lines grew, as the engines fell silent and the trains stopped moving, people came to envy those like Randy. Having metacarbon teeth that could bite through bone and a metacarbon laced stomach lining containing acids and catalysts that could dissolve and metabolize just about anything organic seemed like a great thing. Especially when you were half starving and getting by on a diet of boiled Abraxan threadweed and however many Abraxan bloodworms you could pull from the ground. Those who had put their faith in property and fine clothes, people like Jennifer, in fact, seemed to have backed the wrong horse.

But that was before Abraxas had fully opened up to the outside universe. Now, six years later, there weren't the riches of the Steam Barons but there wasn't the same aching poverty either. People got by well enough, and those as different as Randy were treated with mistrust at best, and outright hostility at worst. Little wonder that when Randy entered the region of Jennifer he did it in disguise, riding on the back of a truck delivering liquid manure to the garden. Half submerged in the tank of slurry, he didn't worry about the smell; in fact he dipped his nose beneath the level of the liquid and took a couple of gulps whenever he felt thirsty. To his re-engineered tastebuds it tasted good. Of course it did, it was full of goodness, there were enough nutrients there to send a field full of seed thrusting to the sky in golden headed glory.

Randy wallowed in the warmth of liquid shit whilst, in the house, Jennifer had just got out of the bath and was rubbing oil into her smooth calves. She wouldn't be eating slurry tonight, that was for certain.

"No, no, no, Jennifer! That's not how one eats a salad!"

"Then how, M. Lombard?"

Jennifer didn't throw down her fork, she didn't show the slightest hint of annoyance at being corrected. Jennifer wanted to be the best at everything, and she relished the opportunity to learn.

"Like this," said M. Lombard, picking up his own fork. He speared a fragment of arugula, a little mizuna, some red leaf. He dipped them

in shiny balsamic vinegar. "You see?" he said, turning the forkful this way and that. "Every moment can be beautiful."

Jennifer's father entered the room. He'd had his skin replaced with metacarbon fifteen years ago, back when the procedure had been prohibitively expensive for the common workers of Abraxas. Now that outside contact had made the procedure more affordable her father had returned to wearing clothes—if a series of polished titanium plates, a completely unnecessary covering to his impervious jet black skin, could be called clothes. But he looked impressive, Jennifer knew. The servants were terrified of him, they shrank into doorways as he strode down the corridors of the house, titanium plates clattering.

"Reynaldo has confirmed he will arrive one week from today at six o'clock," said Jennifer's father. "He will stay here for four days, with an option for a further four if there are complications."

"Stop worrying, Daddy. I was made for this. Reynaldo will fertilize me, you can depend upon it."

"Let's just hope that he can get it up," said her father, darkly. "It's cash on conception. He won't be the first man to shrivel under pressure."

Jennifer touched his hand.

"You worry too much, Daddy. I know my business. And if not, there are drugs."

"I hope so for his sake. The Shinkansen are paying him a fortune to go up for stud." Her father paused and sniffed the air.

"What is that smell?" he said. Annoyance flickered across his face. "Are the drains backing up again?"

"I don't know," said Jennifer. "Why don't you go and see?" She turned to M. Lombard. "I think that I have had enough practice for today. I will go and have a lie down; I need to be ready for next week."

"Certainly, Jennifer," said M. Lombard.

Jennifer entered her bedroom to find Randy sitting on the bed, a reactionless pistol pointing in her direction.

"Randy!" gasped Jennifer. "I thought it would be you. Who else would smell so bad? How did you get in?"

"By sticking to the places where your staff don't want to go."

She wrinkled her nose. The air around her glittered gold as the region of Jennifer sought to assert itself. "You can put the pistol away, you know," she said.

"I'm sorry," said Randy. He looked at the pistol as if he had forgotten he was holding it. "I wasn't sure it would be you coming through that door." He pushed the pistol into his pocket.

"What do you need a gun for, anyway? No one here is going to hurt you."

"What about your father? I heard that he had a man whipped for speaking to you out of turn."

Jennifer smiled.

"Oh Randy! That was in the old days, before FE. Besides, he never had the man whipped. He just spread the story to add to my cachet. You never understood my role, did you?"

"So what did happen to the man?" asked Randy, stubbornly.

"He was fired. His family were turned out of their house and he was banished from all Jarre family property."

"And you think that was right?"

Jennifer pouted. It was a pretty pout, taught to her by M. Lombard.

"I'm not here to question my father, Randy."

"He's not your father, Jennifer. I don't know why you still call him that. All the patronage nonsense died with the Steam Barons."

Randy was sulking. Worse than that, a brown stain was spreading across the shot silk of the counterpane. The bedclothes would have to be burned, that was for sure. Jennifer put on her prettiest smile.

"Listen, Randy, it's lovely to see you and everything, but what do you want?"

"I'm here to stop you mating with Reynaldo."

Jennifer laughed: it sounded like rain falling on silver bells.

"Oh, Randy, how sweet! You've come to save me!"

Randy didn't like it indoors. It was too hot and sterile for him, so Jennifer agreed to take a walk with him in the garden. She gave him a few minutes to sneak out of the house, then went and found him lurking by the treeline at the end of the long lawn. He was on his hands and knees pulling pale bloodworms from the soil and pushing them into his mouth. Purple

juice ran down his cheeks.

"Sorry," said Randy. "I get so hungry."

"Don't worry about it," said Jennifer. "The gardeners will be grateful. And the farmers. The bloodworms eat their way up through the heels of the Ge-Cows when they sleep. They can live inside the creature for weeks, eating away at the interior. It causes no end of trouble, getting them out."

"They taste good," said Randy, wiping his cheek with the back of his hand. "I'm sorry. I'm almost done."

"How did you find out about Reynaldo?" asked Jennifer. Realization dawned, and she snapped her fingers. "Don't tell me. The Free Abraxans! Oh Randy! You always talked about joining them!"

"You shouldn't laugh at us," said Randy, softly. "You have no idea. Do you know that after the outsiders arrived the Steam Barons sold this planet to the Slavemakers?"

"It wasn't *just* the Steam Barons, Randy. After the big share-out we all took a stake in the planet. That's they way it goes. We're all Free Abraxans now."

"No we're not. The same people are in charge. The Steam Barons negotiated the terms with the Slavemakers."

"Who else? They were the experts."

Randy was getting annoyed. Jennifer eyed those big hands of his, re-engineered to pull flesh from bone. What could he do if he were to really lose his temper? She spoke in her most reasonable terms. "If we were going to trade with the Universe, then who else should we choose to negotiate? Look what we got in return! All that new technology. No one goes hungry any more. There's food for everyone, and in return the Slavemakers were granted a little space up in the mountains, where we've no use for the land."

"You think that was wise? The Slavemakers control a volume of space at least twenty times that of the human region. They'll want to enslave this planet too, eventually."

"The Slavemakers can't control anyone without their permission."

"You know that people voluntarily enslave themselves?"

Jennifer looked at Randy, stinking of slurry and bloodworms, and dressed in old meta-plastics he had managed to scavenge from the abandoned factories. She was too well

brought up to mention his own form of enslavement.

"It takes all sorts," she said, she said diplomatically.

Randy sucked down the last bloodworm. His hands were stained red from where he had fought to pull them from the soil.

"Anyway, that's not the point," he said, pale flesh spraying from his mouth. "They're playing the long game."

"How?"

"They're shaping how we evolve," said Randy. "They're choosing who people mate with." He waved his hands toward the distant bulk of the Ge-cows, their bodies the size of fuel tankers. "It's selective breeding. We're just like cattle to them!"

Jennifer laughed.

"So that's what this is all about! Well, let me tell you, I breed with who I want. Not that it's any of your business."

"You *want* to mate with Reynaldo?"

Jennifer waved her hand around the garden. "Look at all this," she said. "A whole garden planted for me. I have a beautiful house to live in, I get to travel anywhere I want. Anywhere in the known Universe! In return I'm expected to look beautiful, keep myself healthy and to deliver one child every three years for the next twelve years. It's not an onerous responsibility."

"You think so?" said Randy with a nasty smile. "Do you know what Reynaldo is?"

Randy refused to tell her more. He offered her his hand, and she wiped it down carefully with a cleanee before taking it.

"Where are we going?" she asked.

"The service valley. Summon one of your cars to meet us there."

"Where are we going?"

But Randy was silent. Jennifer thoughtfully tapped instructions on her thigh.

A road ran down the bottom of the service valley, next to the rusting railway tracks, down which the trains had brought the supplies that kept the house running, back before the outsiders had transformed life on Abraxas. The service valley couldn't be seen from the house, Jennifer had no need to look on its sullen grey length. She was a creature of flowers and light, not of grey gravel and rust.

"You bring me to the nicest of places," she said. Yellow slicks of Abraxan slime mold

flowed over the rocks. Stand still too long and they'd try and engulf you.

"Where's the car?" asked Randy.

"It will be on its way," said Jennifer. "Tell me, why should I come with you?"

"Because Reynaldo is a Slavemaker," said Randy. "Or did you know that already?"

Jennifer was silent.

"You didn't, did you?"

"How could Reynaldo be a Slavemaker?" said Jennifer, and her frustration at his stupidity almost broke through. M. Lombard would not be pleased. "How could I mate with an alien?"

Randy really could be quite irritating: he still hadn't outgrown that air of superiority Jennifer remembered from their younger days,

"When we first colonized this planet the air was slow poison," he began. "The plants were inedible. They wouldn't kill you, they hadn't evolved the necessity, but they provided no nutrition."

"Yes? So what has that to do with my mating with a Slavemaker?"

Randy ignored her.

"So the Steam Barons tailored the virtual machines to live within us, to act as a interface between the outside world and our bodies. Eat something on Abraxas, and the VMs convert it into something nutritious. It saved the Steam Barons having to import real food here."

"Fine," said Jennifer. "How does that mean I can mate with a Slavemaker?"

"The VMs don't just mess with our food. They can interact with our bodies and remodel them. That's what they did with the Ge-cows. That's how they remodeled the fish and the worms. That's how they remodeled us."

Randy looked smug. That was one of his worst features, she recalled. Randy always had to be right.

"It's something to do with you and the VM inside you," said Randy. "It will have been altering you, making you compatible," said Randy. He gazed at her. "You don't seem as upset as I would have expected."

"I'm furious," said Jennifer.

"Furious?" said Randy. "That's an odd word. Not sickened, or disgusted. They do play with our minds, don't they?"

"I know," said Jennifer, staring pointedly at the flecks of bloodworm that stained his front.

"There's another thing," said Randy. "The Slavemakers, the way they grow up. Some of them are genetically compatible with the species of the planets they control."

"They don't control this planet, remember?"

"Not yet, they're playing the long game."

They heard the sound of tires crunching on gravel. The car that Jennifer had summoned, a big scarlet telecruiser, rolled toward them, metacarbon skin shining out against the grey surroundings. Jennifer snapped her fingers. A bad habit.

"What is it?" asked Randy.

"Reynaldo can't be a Slavemaker," said Jennifer. "It would have to violate the contract. What are you laughing at?"

Randy was giggling like a little boy.

"Why? I bet you didn't specify in the contract that you could only mate with humans."

"That's not funny!"

"Come on," said Randy. "You've got a week of freedom before the big event. Your so called father doesn't own you. Come with me. I'll prove that it's true."

"Why would you do that?"

"I'm part of the resistance, baby," said Randy. "We don't have to explain our methods."

Jennifer drove the car.

"I can't believe you never learned to drive," she said.

"Why bother? I never had a car, and they drive themselves anyway."

"I suppose." She glanced sideways at him. "You don't mind if I keep the windows open, do you? You really do smell." He was also staining the pale calfskin of the seats, but there was nothing she could do about that at the moment. The car skimmed down the road, the interior perfectly level despite the unevenness of the road.

"You never understood the philosophy behind my chosen life, did you?" said Randy.

Jennifer looked chastened. The steering wheel was already turning to gold where her fingers held onto it.

"I never really understood any of it," she said. "I didn't think it was fair that I was selected for university. There were far cleverer people than me back in Westcliff."

"They weren't as attractive as you," said

Randy. "Sorry, Jennifer."

"Oh, you're not being rude. I know why I was selected. The Steam Barons would have had me marked down as a potential consort. I know that. I wasn't like you, Randy. I never thought of fighting them."

"I wanted to be a teacher or something," said Randy. "You know, I sometimes wonder if they knew what they were doing when they offered me this transformation. They effectively sidelined me. Just think of what I could have done, letting young minds see the truth . . ."

He held up his hands, looking at the serrated edges of his metacarbon nails.

"No," said Jennifer. "I hope you're just trying to make me feel better. I always like the idea of there being real rebels out there. I hate the idea that everyone is just like me."

The fence was broken up ahead of them. A Ge-cow stood in the middle of the road, chewing complacently. The car swerved around the creature, the scarlet telecruiser dwarfed by the vast frame of the modified creature. Brown eyes stared down at Jennifer.

"Speak to me, Randy."

Randy coughed.

"I always liked you, Jennifer," he said. "I sometimes wonder if I became what I became in reaction to you."

"Oh Randy, you know that isn't true. You were always idealistic. That's why I like you."

Now that they were past the Ge-cow the car speeded up once more. The road here wasn't so well kept.

"Hadn't you better slow down?" asked Randy. "We'll skid on the gravel."

"You can't skid when you're using a reactionless engine," said Jennifer. "Don't you know anything about the new cars?"

"Reactionless?" said Randy, perking up. "I've been wanting to have a drive in one of these." He ran his hand along the leather dashboard. "Any momentum they borrow has to be paid back later. Not that that makes any sense. You know that a reactionless drive is impossible according to human science?"

"Is it?" said Jennifer without interest. The car crunched across the loose stones, maintaining a steady hundred kilometers an hour. She glanced at the dash display. "Another two hours to the Marble City," she said. "After that we'll start climbing into the mountains. I guess my father will have missed me by then."

"Will he come looking for you?"

"Why should he?" asked Jennifer. "I'm under constant medical monitoring as part of the contract. He knows my location at all times."

They drove past Marble City. Ships descended from the skies and rose back up again in a steady stream, their skins flickering with patterns. Randy gazed up open mouthed as they sped past.

"Have you been into space?" asked Randy, ducking back in the car. He'd been leaning from the window like a little boy.

"Of course," said Jennifer. "Have you?"

"No," said Randy. "I'd have to get a new VM. This planet is written into my body."

They drove on past the city and onto a wide road that led to the distant mountains. Snow banded their middle slopes, their tops rose into the upper atmosphere, past the weather. They car sped up the mountain road, easily passing the wide green trucks that ran up to the plateau city of New Vladivostok and its surrounding mines.

"I'm feeling hungry," said Jennifer. "You must be starving."

"I didn't want to disturb you. You looked so happy driving."

"It is nice to be out. Thank you. But I need to eat. Let's pull in here."

Randy looked at the large green trucks surrounding the roadside diner without enthusiasm.

"Are you sure?" he said. "I've had trouble in these places before."

"Stop worrying," said Jennifer, the light twinkling around her hair. "Everyone loves me."

"I'm sure they do," said Randy. "It's not you that I'm worried about."

She guided the car into a space, golden feet pressing golden pedals. Randy was looking at the waste bins around the side of the building.

"Oh Randy," said Jennifer. "Don't eat from the bins. Come in and keep me company."

"I'd be happier with the garbage. Your food is all so tasteless to me. And I need to eat much more than you. Besides, you don't really want to see me eat again, do you?"

"Shut up and get inside."

"Shut up doesn't sound very Jennifer," said Randy, but he shut up and went inside anyway.

The interior of the diner was low and dim. One by one the faces of the truckers turned toward Jennifer. The woman behind the counter was rail thin. She was the only one looking at Randy.

"Oh no," she said. "Not in here. His smell will put everyone else off."

"He's with me," said Jennifer.

"Hey, let him stay," said a nearby trucker, his forearms the size of hams. He pulled back a seat from a table in the middle of the room. "You sit down here, lady."

Jennifer smiled at him and sat down at the table. After a moment's hesitation, Randy sat down opposite. Unbidden, the woman behind the counter came out and placed a white table cloth over its top. She returned with a glass vase holding some rather tired looking Abraxan daisies. Jennifer smiled delightedly at the attention.

"What would you like?" asked the woman.

"What would you recommend?" asked Jennifer, hands folded neatly in her lap.

The woman looked her up and down.

"Chicken and yellow pepper salad," she said, thoughtfully. She turned to Randy.

"I'll have whatever," he said. "Honestly. Mix all the garbage up in a bowl and I'll have that."

"He's asking for your stew, Maureen!"

Maureen ignored the trucker who shouted this out.

"I'll give you a salad, too," she said to Randy.

Maureen left them alone. Jennifer smiled at Randy.

"See? This is nice!" she said.

"Hey! Princess! How come you get a table cloth?"

The female trucker who stood by their table was as wide as she was tall. She held a Chechen joint between her teeth, blue smoke curling up into the air.

"I don't know," said Jennifer, politely. "Would you like to join us? There's room for another."

Across the room another trucker laughed.

"There you are, Kim. That's called being polite."

"Shut up, Trey." Kim scowled and stalked away.

"Honestly, Jennifer," said Randy. "We really aren't safe here."

"I'm safe everywhere," said Jennifer. Gold

dust settled on the white tablecloth where she rested her ivory hands. "Besides which," she added. "I'm with you, the hero of the resistance. You'll protect me."

"You don't really think that, do you?" said Randy, looking around the room. "You never did take me seriously, did you?"

"Oh, I always did," said Jennifer. "It's just that I'm more pragmatic than you. I think you're right, and that the world is a mess. It's just that I don't think that one person can make a difference."

"Well, I do," said Randy.

"Chicken Salad," said the waitress, dropping the plates on the table.

First one person, then two, then eventually everyone present sat watching Jennifer eat her chicken salad. Until they had seen it, they wouldn't have believed that the act of eating a meal could be transformed into a bravura performance. Each perfectly constructed forkful, the curve that her hand followed through the air, the delicate way her mouth took each morsel from the end of the fork . . .

Only the clatter of the door disturbed her.

"So, it's true, then."

The man who stood in the doorway wasn't that tall, but he looked mean. He wore a metacarbon skin, ribbed like an old fashioned truck tire.

"I don't want to hear it, Naqash," said Maureen from behind the counter.

The man ignored her. He made his way across to Jennifer's table. She laid her fork on the table cloth and smiled up at him, politely.

"Do we usually have golden cutlery here in here?" he asked.

"I don't know," said Jennifer, brightly. "Would you like to join me?"

The man pushed the salad onto the floor. Randy pulled the pistol from his pocket.

"Put it away," said Naqash. "I've got a suppressor running." Randy pointed the pistol at the ceiling. He pulled at the trigger, once, twice. Nothing happened.

"Now, garbage boy, why don't you get on the floor and lick the dirt?"

"I don't need a pistol to fight you," said Randy, standing up.

"Sit down, Randy," said Jennifer, easily. "No-one here is doubting your prowess."

"Do you think he'll protect you?" said

Naqash. "He's strong, I grant you, but how well would he fight with four people holding onto him?"

"Not so well, I'm sure," said Jennifer.

Naqash looked around the room. "You see what she is, don't you?" he said to the bar in general. "A princess? I don't think so. She's just a womb for sale. At the end of the day she's nothing more than a whore, just like any other whore you can find along this road. Well, wouldn't you like to have her? Show the stuck up bitch she isn't so special?"

"Who's special?" asked Randy. "She's just the same as the rest of us. She comes from Westcliff."

"I came from Westcliff too," said Naqash. "And you know what, I wasn't deemed to be part of the genetic elite. But just think, if I fuck her then my kid could be. My kid could be one of the chosen."

"You lay a finger on her and you'll be dead before the hour's out," said Randy, calmly. "She must retail for something like half a billion a child. She's lined up for her first next week. I doubt that the man who has laid down that sort of money would take your . . . intervention . . . lightly."

Naqash gazed at him.

"Besides," said Randy, smiling widely to show his serrated metacarbon teeth. "Didn't anyone ever tell you not to piss off a garbage eater? I don't carry a pistol to protect myself. I carry a pistol so I don't have to do this."

The man was standing right next to him, his crotch pressed insolently close to Randy's face. The man's body radiated heat, way too much heat. Randy leant forward and bit deep into the man's thigh. There was a scream, a spray of red. Randy pulled back, a strip of meat torn from the man's leg. The screaming increased. Now people jumped from their seat, but they didn't move forward: they merely looked on in horror.

"Mmmmm," said Randy, licking his lips. "I could eat you all up."

Jennifer looked distressed. Specks of blood were sprayed across her golden forehead. This was not suitable behavior for the region of Jennifer.

"I'm sorry," said Randy, wiping blood from his mouth with the back of his hand, "but I did say we shouldn't come in."

"I know," said Jennifer. "I'm sorry. Let's go."

"He tastes funny," said Randy, to the room in general. "He's done something to his VM. Tried to change himself. He's burning up with excess energy."

Naqash was thrashing on the floor, trying to paste the strip of flesh back into place.

"You have to do it right," observed Randy as he walked Jennifer from the room. "Get the balance wrong and you can send yourself psychotic."

They drove higher into the mountains. The road was a wide band of roughened metacarbon cut between the dirty ice sheets that crawled down the tilted slabs of rock. Shelves of ice and snow overhung the road. Jennifer had to wind up the windows to keep warm.

"The cold is worse than your smell," she said.

"You're too clean for me," said Randy. "Too sterile."

Their two regions fought it out with each other, neither of them felt comfortable.

"What's the matter?" asked Jennifer, letting go of the wheel and turning to face him. The car drove itself better without her attention.

"Nothing," said Randy.

"Is it because I made you accompany me into the diner?"

"You were showing off," said Randy. "I thought better of you than that."

"I'm sorry," said Jennifer. "It's what I do. I make the perfect environment for my child. I want people to see that."

"Don't you feel like an anachronism?" asked Randy.

"Not at all," said Jennifer. "People will always want the best for their children. I'm just doing the best that I can. I . . ."

"Stop the car!" shouted Randy at the same time.

The gravelsnake was stretched across the road, the long tube of its body squashed in several places where the wheels of the trucks had gone over it. Its grey mottled surface was half rotten, half frozen. Randy was out of the door and heading toward it before the car had even stopped.

"Oh, Randy! No!"

"I'm sorry," he called over his shoulder. "I need to eat!"

Jennifer watched Randy as he raked the skin off the gravelsnake with his fingernails, peeling

it back to expose the purple flesh beneath. He plunged his head deep into the alien meat and tore a strip clear with his teeth.

Jennifer concentrated on the car's dashboard. She thought that maybe some music would take her mind off Randy's meal. Perhaps a little Bach. The sound of the horn made her jump. The dark green tanker that rumbled down the hill was almost upon them before she noticed it. It was aimed for Randy.

Jennifer jumped from the car and ran across the road, slipping on the ice and the mushed up snake. The cold air bit at her lungs.

"Randy!" she called. The truck had gone right over him. He lay, unmoving, on the road.

"Randy!"

To her relief, Randy stood up, holding his left arm in his right.

"I rolled beneath the wheels," he said. "It caught my arm."

"Are you all right?"

"I think it's crushed. It will heal. That's the benefit of being a garbage eater."

Jennifer was shivering, her lips were numb with cold. The sky was a brilliant blue up here, and the air was bitter.

"Hey!" he said. "I'll be okay. You're the one who needs to get in the car. Look at the way you're dressed!"

"I know," she said. Her silk dress outlined every goose pile.

"And don't worry," he added. "They won't come after you. They won't be that stupid."

"I know that," said Jennifer. "But that's what makes it so much worse. I don't want to see you get hurt. Stay close to me, Randy."

"I will."

* * *

Jennifer felt as if they were driving into space. Would it be possible, she wondered? Build a road that carried on up the mountains and into the stars. Watch the sky fade from blue to black? Build up speed and drive off the edge of the road and float out into space? Travel in a line until you met another road that carried you gently down another mountain and onto the surface of another planet?

Randy slept on the back seat, moaning occasionally. He was burning up with heat, his increased metabolism pumping out energy as he healed himself. She let him sleep. They were being followed. She could see it on the car's screen. Six trucks, grinding up the hill

behind her. She was moving faster than the trucks, but it was clear that she couldn't turn back. They were herding her toward the road block that waited up ahead.

Four green trucks parked shoulder to shoulder. More than once, Jennifer wondered if she should call her father for help. She didn't bother. She was perfectly safe, her father wouldn't care about Randy.

Just short of the plateau of New Vladivostok she came to the road block. Jennifer slowed down the car and climbed out.

The two women who climbed from the cabs wore metacarbon skins. Razor fins were implanted on the back of their hands. They moved in jerks and rushes. Jennifer didn't need Randy to tell her these were people who had attempted to modify their own virtual machines in order to boost their bodies. The two women were shorter than Jennifer, but much, much stockier. They folded their arms, grey razor fins glinting in the light, and gazed up at her.

"Let me past, please," said Jennifer. "You must realize you won't be allowed to harm me."

"We don't intend to harm you," said one of the women. She pointed to the car. "We want the garbage eater."

Jennifer shook her head.

"Then we'll take him from you," said the other woman.

"I'll drive the car into your truck rather than that," bluffed Jennifer, turning to walk back to the car. A metacarbon hand seized her shoulder.

"Please let go of me," said Jennifer.

"Just stay here whilst Geeta pulls him from the car."

"One woman against Randy? Did you hear what he did in the diner?"

"Geeta can look after herself. She's pumped."

"Take your hand off my shoulder."

The wind blew a gentle stream of ice flakes across Jennifer's face. She breathed gently.

"I said, take your hand off my shoulder."

The woman laughed. Jennifer concentrated.

"You bitch!" shouted the woman, snatching her hand away. "That hurts! I can't move my hand! What did you do?"

"Didn't you know?" said Jennifer. "Everything I touch turns to gold. I bend the envi-

ronment around me toward producing the perfect child. Anything that interferes with that harmony is removed. You think that my friend is dangerous? He's nothing compared to me. Now. Are you going to move your trucks? You're disturbing my balance."

Randy woke up as they pulled into New Vladivostok.

"Feeling better?" asked Jennifer.

"Much better," he said, shaking his arm.

"Did I miss anything?"

"Nothing worth mentioning," said Jennifer.

Vladivostok seemed to consist of nothing but loading bays. Train tracks from across the plateau converged on a network of sidings. Trucks lined up to receive the ore they brought, ready to carry it down to the factories of the plain, far below.

"Why do the Slavemakers live so high up?" asked Jennifer, pulling a golden jacket around herself.

"I don't know. Maybe they prefer a thinner atmosphere?"

"This place is filthy," said Jennifer.

"It's cleaner than it used to be," said Randy.

"Look, most of the chimneys aren't working now. Even with virtual machines in their bodies, the people here used to be made sick by the pollution."

Only a handful of the hundreds of chimneys trailed thin black smoke into thin afternoon.

"There used to be black dust covering everything here," said Randy.

"But those days are past," said Jennifer.

"Come on. We'll have to rent a mule or something to get higher up. . . ."

* * *

They found a woman willing to take them up to the Slavemaker land. She led them along thin paths carved by gravel snakes, higher and higher, past the scenery, leaving all color behind, until there was nothing to be seen but tumbled piles of grey scree, the white angry foam of churning streams, and the solid grey rocks that were slowly slipping their way down to the plain. Jennifer took it all stoically, wrapped in a golden jacket. Randy became increasingly irritable. There was nowhere near enough food for him up here.

The Slavemakers' settlement nestled in a bowl of stone held among the high peaks. The

settlement seemed to be grown from sponge. Yellow and pink and dayglo green domes clung to the rocks. Enslaved Abraxan animals moved among the sponge buildings, on mysterious errands of their own. There were other animals there that Jennifer had never seen before, brought to Abraxas from beyond the skies. Yellow shovel faced beasts scraped Abraxan slime mold into piles, tall crane like birds stalked back and forth, mist spurting from their nostrils in the cold air.

"Why are we here, again?" asked Jennifer.

"To speak to the Slavemakers," said Randy. "Look." There was movement by one of the sponge domes, a silver ribbon unrolling itself across the rocks toward them, like a tongue coming to meet them. The end of the ribbon uncurled perfectly before their feet. Jennifer stepped onto it without hesitation and walked along it toward a shocking pink sponge.

A grey Slavemaker stood waiting for them in an orifice in the sponge's side. It looked like the president of the world. Tall and distinguished, with dark eyes and a firm smile.

"It looks so human," said Jennifer.

"I heard that a Slavemaker's form is chosen while it's still in the egg." He raised his hand in greeting. He seemed more comfortable now that he was here. He was back in control.

"Good afternoon," he said.

The Slavemaker spoke in a voice that sounded like a soul singer's.

"Good afternoon, Jennifer," it said, in a voice as rich as chocolate. "Good afternoon Randy. Would you like to come inside? There is food and drink."

The Slavemaker looked at Randy.

"If you will stand aside I will command the Zil creature behind you to come inside and die. It will feed you well."

Randy turned and looked at the creature that shambled up behind him. It looked like a pig built of garbage.

Randy was too hungry to say no. Jennifer was too well bred to reveal her disgust.

They sat in a room decorated with human furniture. Only the soft, spongy walls betrayed their alien origins. The Slavemaker sat in a leather chair, one leg crossed over the other. It looked perfectly at ease, the president of the world relaxing after a busy day. They waited while Randy finished his meal. Jennifer sipped

golden tea and made small talk.

"You want to take over this world," said Randy.

"We do," said the Slavemaker. "But not right away."

"You're shaping the way that we evolve," said Randy.

"Yes," said the Slavemaker. Randy looked at Jennifer.

"That's not allowed in the terms of the FE," she said.

"More precisely, it was not specifically forbidden," said the Slavemaker.

"Then you don't deny it? You intend to guide human evolution in order to make us more compliant?"

"Not at all. We intend to do nothing."

"Nothing?"

Jennifer understood.

"You don't think it's necessary, do you?"

The Slavemaker nodded.

"You understand, Jennifer." It turned to Randy. "You see, you complain that the Steam Barons sold you to us, but first you sold yourself to the Steam Barons. You are nothing but a race of slaves. Humans like to be told what to do. There are very few who are willing to take responsibility."

"That's not true!" said Randy.

"It pleases you to believe that," said the Slavemaker. "But the Steam Barons knew exactly what the deal was. Stick around for a thousand years, Randy, and you'll see I'm right. By then this planet will be shaped just the way we want it. The humans who don't like it will have left, gone somewhere else. Many will remain here, by choice."

"No," said Randy.

"It's true," said Jennifer. "Not only that, they'll have other people coming here to join them. There will be humans flying to this planet from across the galaxy. They'll want to be part of this."

"Jennifer! How could you say that?"

Jennifer smiled at Randy.

"Because I know who I am. I'm not some great hero. I'm just someone looking for the best possible life for me and my children."

"Even if your children are fathered by a Slavemaker?"

Randy turned to his host.

"It's true, isn't it? Reynaldo is a Slavemaker."

The grey man inclined his head in agree-

ment.

"You see, Jennifer?" said Randy.

Jennifer looked away.

"You don't care, do you?" said Randy.

Jennifer didn't answer.

"You see, we know humans," said the Slave-maker. "We know all about our subject peoples. That's why we will eventually rule the Universe. Humans only care about their freedom when they're young. Old people don't rebel."

"That's not true," said Randy.

A sound of metal plates clanking. A man walked into the room. His skin was dark metacarbon.

"Hello Daddy," said Jennifer.

"He's not your father," said Randy.

"Not biologically speaking, but he's the man who made me what I am," said Jennifer.

"Only so he could make a profit from you."

"Not just for that reason," said Jennifer's father, kissing her on the cheek. "I love her as well. There's something about a well-made piece of machinery. And Jennifer is the best."

He looked at his daughter.

"I hope you enjoyed your little excursion," he said. "But it's time. Reynaldo arrives tomorrow. We need to get you ready."

"I know," said Jennifer.

Her father looked at Randy.

"There's space in the flier if you'd like a ride back down to the plain."

* * *

Jennifer sat with her father as the flier descended.

"You always liked him, didn't you?" said her father.

"Yes," said Jennifer. "But not as much as you might think. I pity him too much. He'll always be too idealistic."

"Hmm," said her father.

Jennifer looked at him.

"We really did sell ourselves to the Slave-makers, didn't we?" she said.

"Do you care?" asked her father.

"Am I a slave now?"

"When someone can change your body, tell you what to do, tell you what to wear, even when you're going to mate, then you're their slave," said her father. "Does that bother you?"

Jennifer looked around the interior of the flier, decorated in white and gold. The floor beneath her feet was dusted in gold. The region of Jennifer had taken hold.

"Does it bother me?" said Jennifer, thoughtfully. "No, I don't suppose it does."

Her father looked out of the window.

"I can see your friend down there. He cares."

"That's good," said Jennifer. "It sort of relieves me of the responsibility. I can sit back and do what I want and hope that other people sort out the mess we're in."

Silence.

"Is that bad of me?" she said.

"It's human," said her father. ■

Survivors

Ron Collins

It was warm for early September, but Daytona Beach would have been busy even if the Sun wasn't blazing down. Hiram lay on a towel, propped up by his elbows, watching girls walk by. Waves slid up the beach, then slipped back toward the ocean like silent curtains. The half-moon drapes of wet sand left in the aftermath erupted with dimples made by mole crabs as they dug their way toward China.

"Look at 'em, man," Taylor said, burping as he threw another can of beer into the trash at the trunk of the car. Taylor was a junior at USE, majoring in something that would almost certainly lead to a life selling insurance. They were together with a group of guys—all friends from back at McKinley North high school, each enjoying a last blow-out before retreating to the hallowed halls of their chosen facilities of higher education, none of which would be populated with women in bikinis.

This was not what Hiram would have chosen to be doing. He had picked this host, however, and had learned long ago that making a host avoid things it would normally do was a bad idea.

"Them bugs always make me laugh," Taylor said.

"Not *always*," Hiram replied. He hated absolutes. "For example, you're not laughing now."

"You know what I mean."

"Yes," Hiram said. "I know what you mean."

What Taylor meant—according to Hiram—was that he, Taylor, was too damned stupid to see that the crabs were just doing what they were supposed to do, that they were a species whose entire universe was contained in the top hundred centimeters or so of the crust of the earth, and whose existence relied completely upon the unrelenting waves and the constantly shifting tides to keep them in places where the water broke and helped them collect the plankton that fed them. What Taylor meant was that he was too damned stupid to notice a life-and-death struggle even when it was happening right before his eyes.

It wasn't Taylor's fault. He was a human being. Their lives are too short, their connections too slight. They did not feel things as deeply or instinctively as Hiram could.

It wasn't fair, though. Why do these humans live, while his people pass into the realm of galactic history?

Using his hand as a visor, Hiram peered over the late afternoon wash to where the constellation Taurus would soon appear if it weren't still daylight.

"You wanna go to The Drop tonight," Taylor said, fishing another can from the cooler. "Those girls said they're gonna be there."

Hiram sipped his own beer, feeling an all-consuming sense of resignation at just how deep the need to procreate is in any species.

"Sure," he said. "The Drop sounds fine."

He had left his home star some eight thou-

sand years ago, traveling in a stasis cocoon designed to give him comfort. It had not been bad, not really. The field worked for the most part, and he woke only three times for barely a year or two each.

He was also lucky that the first time his field broke, his home star had not yet been destroyed, so he was able to enjoy the ultrahigh frequency of the Pentali music they piped to him. He also received a steady stream of news-feeds that told him of the final preparations his people were making for their star to go nova. It made him weep to know that everyone he left behind was going to be gone soon, but he could not deny that listening to the feed also gave him a sense of pride larger than his body could contain. His were a noble people. They faced extinction with such beautiful dignity.

He, along with thousands of other chosen survivors, was their hope. They had been feted, and worshiped. Their memories had been loaded with every element of information about their culture and their history that could be stuffed into them. The survivors would carry the genetic content of their species wherever they went.

They were all his people had left.

So, with the stasis pod working mostly as designed, and flying at near the speed of light, the seven-thousand-year flight—give or take a few—was easy. Then his cocoon's analytical programs deemed the third planet of this remote solar system to be inhabited, and its piloting routines guided him through the atmosphere, providing him a fiery entry made in a golden blaze one evening late in a month the indigenous people called August. It took him some time to dig out, but when he did he quickly gathered his first host, a young man named Kanji who had come to investigate the fire in the sky. Kanji was a thin, wiry man who had worked in rice paddies his entire life.

It was through Kanji's eyes that the traveler got his first view of the nebula that had once been his home—a bright spot, visible even in daylight, that would eventually become known to human beings nearly eight hundred years later as the Crab Nebula.

Something had gone wrong, though. There were supposed to be more of him on this planet, but he had searched for a thousand years across hundreds of hosts and found nothing. No signs of other survivors, no signs of other

crashes. So over the years, Hiram had come to the staggeringly heavy conclusion that he was the only traveler who had landed on this planet that humans called Earth.

Until now.

Hiram was so shocked he nearly dropped his beer mug.

She was on the dance floor all by herself, moving to the beat of a Maroon 5 song that was, thank the human Gods, most definitely not that thing about Jagger. Her dark hair was cut short, or he might have missed the telltale red dot at the nape of her neck even though the strobe lights pulsed at a marvelous quarter-second interval that helped him see it glow slightly. She wore a pair of white jeans and a striped top that, when she raised her arms over her head, lifted to bare her navel.

The red dot was mesmerizing.

It was a twin to the one at the base of his own neck. It was a scar left when they took a host—the place where they entered the body and then drilled upward into the host's brain. For an instant he wondered if he had taken this girl as a host *earlier*—if the dot was one of his own making. But that couldn't be right. She was young, like Hiram's current host. He would not have forgotten something so recent.

He ran his palms down his pant legs. Was it possible? Seven thousand years in a cocoon, and a thousand scouring the planet, and he had never found another survivor. But he felt her. He sensed her presence with something humans might consider smell, but was really more of a warmth, or a tingle against the membranes of his host's nostrils. The red dot spoke to him, and the girl danced amid sound waves that rolled over him like a hot shower.

Yes. It was possible.

Taylor noticed his double-take and screamed into his ear as he put his hand on the small of Hiram's back. "She wants you, man! Get'er done!" Then he launched Hiram out of his seat.

He nearly crashed into the girl, but she had her eyes closed and didn't seem to notice.

He took a step back.

The girl turned in place, arms stretching up to the sky.

He wanted to reach out and touch that red dot. He wanted to feel the scar to make sure it

wasn't just a tattoo or a birthmark.

"Are you gonna stare or are you gonna dance?" the girl yelled. She had consumed considerable quantities of alcohol.

Hiram was no dancer to begin with, and had only been in this host for a few weeks. So he just kind of bounced on his feet. The heat of the kids on the floor made him sweat. Another song replaced Maroon 5—a mash-up this time, Pink, D-Jive, and MoTzart KZ.

The girl's skin was milky. Her eyes were blue—not unheard of, but a bit of an oddity on one with such dark hair. His host body responded to hers. This close, he could smell the red dot.

There was no doubt.

She was a survivor. Another of his kind.

His head nearly exploded with questions. Every cell in his system wanted to link. His human eyesight grew wavy as his eyes teared up. Could it happen? Could the two of them be the ones to make their civilization whole again? Hiram struggled to find words. What do you say in a situation like this? Where have you been all my life? Do you come here often? When were you launched?

He reached out to her with his need to link, but she was vacant, a wall of silence.

"Do you want to go to the beach?" he asked when the next song transition came.

She ran a hand over his shoulder and up to cradle the back of his head, drawing him closer as if to kiss him. Her finger grazed his red dot. Her eyes grew suddenly wide, and she stopped moving as she was just now sensing him for the first time.

"No," she replied.

Hiram pressed closer, putting his hand on her waist. He felt her stiffen. The pressure of his hand seemed to keep her rooted in place as waves of sound played over them like surf.

"Can I get you a drink?"

"No," she said again. "I'm going to the ladies room." And she bolted through the crowd.

Hiram waited for nearly thirty minutes before asking another girl to check on her.

It was no use.

She was gone.

He felt a sense of loss deeper than any he could remember, a loss that shredded him as certainly as if she had exploded and sent star-dust shrapnel across his universe.

Why had she run? What had he done wrong?

He tracked her, of course. To connect was ingrained in him, and knowing there was another survivor on the planet gave him renewed hope. She wasn't hard to find the first time. It took only a few dollars placed in the right palms and a bit of asking around in local hot spots.

But she ran again, and then her apartment was empty.

The next time he found her she was in Arkansas.

Then Vancouver.

Then she was tending bar and waiting tables at a pub in the tiny Scottish town of Pitlessie. Each time, she ran.

Then she went dark. Nothing. Was she dead?

Sixty years passed before he saw her again.

He was on a vacation tour of Africa, wearing a host named Kanady, a body that was thirty-five-years old and that lived in the Caribbean. He worked at fishing docks and dealt genetically refined cocoa extract on the side. She was wearing a guide, a woman of Norwegian descent who had come to the veldt country when she was eight. Her name was Brita. It was a purely random happening, and it took her days before she recognized him and slipped away, this time escaping while their troupe was out camping, leaving her coworkers with the task of taking care of them, and trekking back on her own.

He sent her a notice, then, passed through the safari company.

"I thought you would like to know that I am through chasing you," he said. *"Live a good life. I wish I knew you."*

He was back home in Nassau, two weeks later, when she sent him the note that asked him to join her for dinner.

He put the paper into the pocket of his work shirt, and kept it there the rest of the day, thinking about Brita as he worked to mend nets and watched over a contractor who was up-fitting a power boat for a rich client. It was simple work, work that kept his mind occupied and left him feeling like he had accomplished something at the end of each day.

The Shanty was an open restaurant with a

roof made of thatched palm leaves and a touristy view that looked out over emerald waves. The aromas of warm crab and cold fruit laced with alcohol drifted on the late afternoon breeze. The sun neared the horizon, and lit Brita's cheeks, which, since her Nordic skin was fair, seemed to be in a perpetual state of sunburn.

She was seated at a table overlooking the beach, drinking something orange. He sat down and ordered rum. They looked at each other over the distances of three feet and a thousand years. The waitress left a plate of papaya.

He reached to connect with her, but received only a cold, empty vacuum.

"Why don't you love me?" he finally said.

She stared over the surf and rolled her straw between her fingers.

"I'm broken," she finally said.

"What do you mean?"

"I can't be with you. I don't . . ." her voice broke. She took a deep breath through her nostrils, then drew on her drink, taking half of it down at once.

"I know what we are here for," she said. "I know what you expect. But I am blank. Don't you see? I cannot connect."

Suddenly it was clear. She had not been blocking him—not shunning him at all. Instead, she was damaged and unable to fulfill her purpose for being here on this planet. Maybe radiation in deep space had taken its toll. Maybe it was something else. All he could say for certain was that he looked at Brita and knew she blamed herself, and that she felt the weight of her people on her shoulders.

She didn't cry. He was impressed by that, though maybe he shouldn't have been. She didn't seem to display any emotion at all. Perhaps that was part of the problem. Or perhaps at one point Brita had despaired over her condition, but the years had left her with nothing but this cold resignation that radiated from her like a beacon.

He didn't say anything at first. Just reached out and touched her hand. How would he feel if *he* were the one damaged? How crushed would he be? He cleared his throat.

"You run because you're embarrassed."

"No."

He waited.

"I run because every time I see you it re-

minds me that I am a failure."

Kanady, who had been Hiram before that, and who had been many others prior to Hiram, sat back.

"I see," he said.

She pressed her lips, then sighed and reached for her purse.

"I wanted you to know why I can't see you again," she said.

He nodded, trying to comprehend this more fully as she slid off the stool and moved away, leaving him behind once again, passing the bar to walk out the door.

"Look at those two," said a man at a table across the dining area. "I think they're breaking up."

"Tell me we'll never be that way, all right?" his partner replied with a hint of snark.

"Never, love. We'll never be that way."

If Kanady had overheard them he might have told them how humans are flawed, how their lives are too short to feel connections as deeply as those whose lives span millennia. Or maybe he would have just nodded and told them how lucky they were to live in such a condensed moment together, holding hands and connecting for only a few scant years, how lucky they were to have each other even if it were only for this brief moment in time.

But he did not hear them.

Instead, he put money on the table, and he left to follow Brita down the beach where she was walking away.

He needed to tell her he understood, and that he would always be here if she changed her mind. He needed to tell her she would be all right. But mostly he needed to tell her he didn't care about tomorrow, that he had long ago stopped worrying about whether he would be one of the pairings that might extend their species. He had learned that life isn't about tomorrow. Life is about today. Kanady needed her to know how lonely he was, how much he yearned for someone like her, someone who understood his pain and who he could understand in return. He needed her to understand how much it had meant to his life merely to know she existed.

As he walked across the beach, waves rolled over the sand to leave clear, dusky patches that erupted in mole crabs digging their way toward China. ■

PAST MASTER OF ELECTROMAGNETISM

In an episode of the original *Star Trek* (“The Ultimate Computer”), Captain Kirk quotes a line from a poem: “(A)ll I ask is a tall ship and a star to steer her by.” It’s from “Sea Fever” by John Masefield, first published in 1902. Kirk goes on to say, “You could feel the wind at your back in those days, the sounds of the sea beneath you.” Now, I don’t know about you, but something about that line and Kirk’s comment sings to a longing in my soul. It is a longing born not out of my past or my memories—I have never sailed on a tall ship—but purely from my imagination.

That’s probably for the best. For all I know, on a real sailing ship I might spend the entire time seasick, hanging over the rail and vomiting my guts out. I’m a fan of central heating, I appreciate modern plumbing, and for me nothing would kill the romance of the high seas more than the inevitable long hours of boredom on a merchant sailing vessel. Imagination lets us cherry pick the parts we find appealing, and if it didn’t there’d be no such thing as fiction.

Wistful thoughts about imaginary maritime adventures have a wide appeal, but my guess is that most *Analog* readers have a few idiosyncratic interests, underrepresented in the general population. Technogeekazoid that I am, one interest that makes me pine for an imagined past is the experimental work done in electrical science back at the turn of the previous century, 1900 through WWI. That’s the era of Tesla and Marconi and Edison, something of a subgenre in the Steampunk world, and I like that just fine. But what I’m talking about was largely confined to university labs, where battles were waged on benches with wound wire coils and magnets and primitive electronic test equipment, and dispatch-

es from the front were limited to the physics journals of the day.

What prompted me to write this column was my stumbling upon an online article at *phys.org* called “Manipulating electron spin mechanically.” The piece itself was no great shakes and described an experiment wherein electrons were prompted to flip their spins via high frequency mechanical vibrations rather than the usual magnetic fields. I was annoyed because it seemed clear to me that the author thought “mechanical means” were previously unheard of, and I happened to know of one discovered a century ago.

You’ve probably never heard of Samuel Jackson Barnett, or of the effect that bears his name. Wikipedia has only a few lines about him (14% of which inform us that when he died, it was a month after his wife did), but it does link to their “Barnett Effect” entry, which is also only a few lines. You may have heard of the Einstein-de Haas Effect (which in fairness should be called the Richardson Effect, after Owen Richardson who suggested it first in 1907), likely only because Einstein was associated with it (and this may be the only experiment Einstein himself participated in).

Take a cylinder of, say, iron, and suspend it on its long axis so it is free to rotate inside a coil of wire. Run current through the wire and this will put the iron cylinder in a magnetic field. The field will induce the spins of the electrons (because electrons are little magnets themselves) in the iron to line up. Since electrons have angular momentum, lining them up a bit with a magnet will cause the iron cylinder to rotate. That’s the Einstein-de Haas Effect, first demonstrated in 1915. The Barnett Effect is the converse of this. Take that cylinder of iron and spin it on its axis, and it will

spontaneously magnetize. The amount of magnetization depends on the rate of rotation and something called the gyromagnetic ratio, which varies from one substance to another and is just one of those values condensed matter physicists measure. Barnett demonstrated this effect in 1914.

So there you have it: a mechanical method to manipulate electron spins (though not a spin-flipper) first found a hundred years ago.

I first heard of Barnett while working on the Marinov motor stuff (see my columns from February and April 1999 and June 2008), while interacting with others who played with magnets and wire in their home shops. A few years later, while consulting, I often combed through old physics journals looking for geeky stuff. A lot of Barnett's papers made the trek to the copy machine. I delighted in reading about what he and his contemporaries researched, and even more about *how* they did it. Oh, to inhabit those laboratories myself! I wish I'd read his papers a few years sooner. One thing that helped immeasurably in the Marinov motor work was my decision to suspend the armature from the ceiling and stop trying to support it from below. This went from being my *eureka!* moment to the "oh, duh" kind when I found out Barnett had relied on suspending similar dinguses a century before.

As I read through some of Barnett's papers (and as I reread them recently), I couldn't help but sympathize and identify with him as he dealt with some who disagreed with the results of his work. A fine scientist, he didn't object to being shown if he was mistaken. But I detected an all too familiar sense of weariness in his written tone as he replied to spurious complaints hatched from experiment-inexperienced minds.

You see, for a while Barnett was involved on one side of the "moving magnetic field lines" controversy as it applied to spinning magnets, and Earle Hesse Kennard on the other. (They were not the only ones.) Barnett was an experienced experimentalist when their disagreements began, and Kennard had yet to receive his doctorate in theoretical physics. (Kennard went on to enjoy a fairly distinguished career, good enough for *two* short paragraphs on Wikipedia.)

I need you to picture an ordinary bar magnet, north pole up. Now picture the magnetic field lines of the magnet, by convention emerging from the N pole and reentering at the S pole. Move the magnet from left to right. What do the field lines do? Historically, and certainly in Barnett's time, that the field lines move with the magnet has been the conventional understanding.

Now imagine a dozen or so bar magnets, attached and evenly spaced, all pointing north pole up, to the rim of a horizontal bicycle wheel, and let the wheel rotate. Again, these are just magnets moving along as in the first case, so there's every reason to think the field lines move with the individual magnets.

Finally, imagine cramming the entire region of the wheel from axis to rim with more magnets until you have the equivalent of a single short, cylindrical magnet, and let it spin. Do the field lines still move with the magnets (or composite magnet)? Barnett and others said yes. I say yes. Kennard and others said no, and it was this dispute among the leaders in the field of electromagnetism that is known as the moving magnetic field lines question.

As it turns out, it is not at all easy to design, let alone perform, an experimental test that will demonstrate once and for all whether or not the field lines move. Most methods tried relied on the fact that an electromotive force (EMF) is generated in a wire moving perpendicularly through a magnetic field, and likewise in a stationary wire when the field is moving. Unfortunately, with a spinning magnet the EMF produced is very weak to begin with, and when you add up all of the EMFs produced in each part of a closed circuit (that is, when you integrate around the closed circuit), you get a big fat zero. A lot of paper was stained with ink in the journals of that day, debating whether or not a particular experimental method predicted a net EMF of zero in both the moving and the stationary field line cases.

A full discussion of the moving lines controversy would fill a book (which I may write) and is outside the scope of this essay. But a specific example of the sort of weary reply Barnett would offer to Kennard that drew me to him is this one from *The Physical Review* back in 1913 (Vol. II, No. 4), in a piece called "On Electromagnetic Induction."

"The brief statement of fact, without reference to authority, in my first paper drew from Mr. Kennard the criticism to which he refers. He said that I had failed to give experimental proof of my statement. References to the experimental work having been given later, however, Mr. Kennard now objects to the experiments of Blondlot, Wilson, and myself on insulators on account of sliding contacts, stationary connecting wires, absence of a conducting screen, etc. These objections are entirely inconsequential and irrelevant and I shall not consider them further. No one will object to the repetition of any or all of these experiments, either modified or unmodified, by anyone who is sufficiently interested in them; but it is quite certain what the results will be."

At the start of this paper, Barnett said it would be his final reply, and you can see why. Kennard had originally accused him of making things up. Then, after references were provided, this kid *theorist* Kennard, unskilled in the craft himself, dumps on the experimental tricks of the trade in common usage by the boys who call the laboratory home. How annoyed I used to get when the armchair experimenter set would offer up criticisms to my Marinov motor work, which were "entirely inconsequential and irrelevant." Sam Barnett, I feel your pain.

It really is a shame Barnett has been largely

forgotten. For reasons I do not fully understand, sometimes fields of research that once owned the mainstream end up as backwaters. Then people forget those valuable aspects and unsettled questions that put it in the mainstream in the first place.

There is a poignant passage relevant to this in another of Barnett's papers, this from the February 1937 edition of *The American Physics Teacher*, called "Models to Illustrate Gyromagnetic and Electron-Inertia Effects." Therein Barnett discusses experiments performed both by him and others, and also describes tabletop gyroscopic gizmos he employed to explain the nature of magnetic physics at the molecular scale to students. In the first paragraph he laments: "Although these experiments were first made and described over twenty years ago, most teachers of elementary physics in this country seem entirely unacquainted with them; and only a few of our elementary textbooks on physics . . . mention them."

Though he would live almost twenty more years and die at the age of 83 in 1956, his brand of physics, like the age of sailing ships, never came back into vogue. By then all the attention belonged to quantum mechanics and nuclear physics and relativity and research performed at large facilities by hundreds of people wearing rubber gloves.

As for me, and I'm sure Barnett felt the same, I prefer small labs and dirty fingers, quiet hours to toil in solitude, *and all I ask is a strong magnet and a line to suspend her by.* ■

The Last Time My Computer Went Down

Kate Gladstone

It's hard to run TurboTax when your laptop is sinking through the table. I sighed and thumbed speed-dial.

"Quantum Computers—Everett speaking."

I introduced myself and described my Toshiba and my problem. "The last time this happened, it took ten minutes and only got half an inch through the tabletop before auto-rebooting and reversing the process. This time, it's almost completely submerged, with no sign of rebooting."

"Did you try turning it off?"

"I can't reach the power switch any more. And if I pull the plug, some peripherals hang on restart." I'd learned that the hard way after a power outage—the next morning, it took me three hours to locate my mouse: neatly suspended from a miniature gallows

that had materialized below the printer.

"Okay, the power switch is gone. Can you reach any part of your computer at this time?"

"Yes, the top left corner of the cover is still visible."

"Touch it and tell me what happens. I recommend using your nondominant hand."

I poked the rapidly descending plastic—and yelped as if I had touched dry ice. With difficulty I pried my fingertips away and warmed that hand in my armpit. "I heard that," crackled Everett's voice. "Sounds like your computer is frozen."

The laptop continued its journey: passing between the molecules of the table, it picked up speed, sliced through the floor, and collided with the concrete of the basement below.

"Sounds like you've got a truly nasty crash. Probably a quantum superposition malfunction—those early-model Schrödinger drives collapse at the least excuse. I'm afraid it's gone down permanently."

"Is this under warranty?"

"For Schrödinger failure? Sorry, nope. You see, technically there's a possibility that your computer is completely functional whenever not being observed. I hope you backed up regularly."

I groaned.

"Let me transfer you over to Sales."

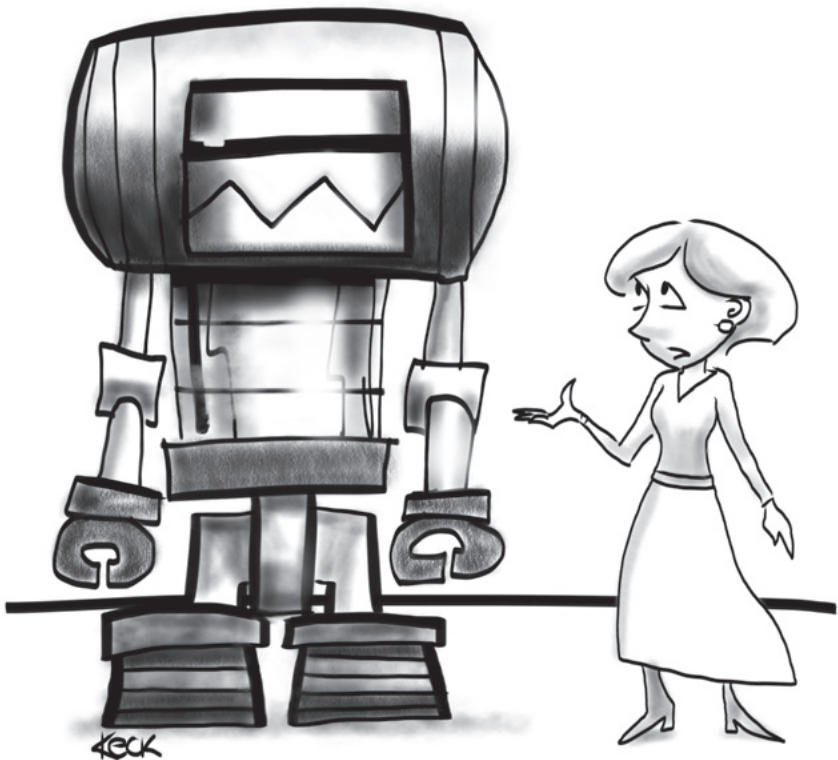
Sales must have been training new staff. The data entry specialist, Ms. Heisenberg, claimed she couldn't enter my credit card expiration date during the same call as my cred-

it card number.

Fortunately, she could manage PayPal, and there were sales on two models guaranteed immune to crashes, freezes, or other interesting ways of not working.

The cheaper one, unfortunately, was a model I'd already had trouble with: tablets and styli and I just don't mix. That left something which didn't have nearly as wide a range of apps. However, it was still cheap enough that I could splurge for overnight shipping.

"You'll need to be there tomorrow to accept delivery. Before we end this call, would you like extended warranty protection for your new abacus?" ■



"This is less of a breakup, and more of an upgrade."

A Star to Steer By

Jennifer R. Povey

They towed the Ai Weiwei back to the La-grange point. The ship was more battered than any ship had a right to be, and still return.

In one piece would perhaps have been an exaggeration. Had the vessel held any crew before, it certainly did not now. The hull resembled, in places, a lace doily, more holes than reality. Both engines were more or less intact, but the port system drive was clearly fried, char marks around the exhaust.

In fact, it was obvious to any observer that the Ai Weiwei was a dead loss. This was not a ship that would fly again without the kind of total rebuild that cost more than a new ship, far more. The only reason to tow her in was for salvage. Recycling.

That did not really affect the tugs. They were only doing their job. The one being it affected most deeply was Ai Weiwei.

Her crew had, indeed, died, although a ship such as her carried very few crew members. Humans were her backup . . . and her emotional support.

She mourned, for even a machine can mourn her comrades-in-arms. Her own survival felt to her like a bitter irony. Painful, even. That she should be so resilient as to survive when the humans, so much more “important”

in the scheme of things, were not.

Maybe they would send her out alone, and bitterness flowed through her at the realization that she did not want to go.

This was the Solar System. This was home for her. She had been built and activated here, in this space between the Earth and the Sun. In this sanctuary, to which the enemy had yet to come. Had yet to come thanks to the effort of her and her sisters. Many of them, by sweet irony, named after activists for peace.

She knew who Ai Weiwei had been. Not even a she. A he. An activist. Centuries ago. When humans had still fought each other. That was unimaginable now.

Or perhaps only unimaginable to a mind designed and carefully programmed to fight those wars, yet awake and with emotions and feelings. The only reason she felt no physical pain was because she had been blessed with the capability to turn it off.

She wished she could do the same thing with her emotions.

The shipyard was a graveyard. Ai Weiwei was far from the only ship that drifted, half derelict, where they left her. Left her with a promise that she would be visited and checked on, a promise she was not sure she should believe. This might be a dumping

ground, and many still felt that the ship-minds were not people. Were not deserving and worthy of the same considerations.

They left her, then, with only her grief for company. The remains had been removed for burial in space, and they might not even consider that she would want to be there, by vlink if nothing else.

They left her with nothing to do but remember.

Being a machine, she could have erased her memories. Could have let them go into a void, but then she would not be the person she was.

Would not and could not, and grief washed over her again, a grief she could no more let go of than she could fly on her own.

Which might never happen again.

"AL-9764, named 'Ai Weiwei.' Dead loss except for the ship brain. Would you agree?" The officer's voice was deadpan as he checked on his tablet.

"What's the state of the brain?" the woman walking next to him asked. By their light step, it could be determined that they were not on Earth, but some world with lighter gravity. In fact, they were on a spin station not far from the ship graveyard.

"Functional with some emotional trauma."

"I don't understand why we don't just do memory edits on them. They're computers, after all."

The officer scowled at her. "Ma'am," he said, lightly, but rather in the manner of a man talking to a woman he had to show respect for even though everything in him preferred not to. "Ship brains are very complicated. Editing their memories tends to remove one instability and introduce another. Sometimes they do it themselves, and then we have a mess." That was not entirely true, but he would not let her mind rape the beings he cared for.

"I find it hard to believe a computer would show such initiative. But that's beside the point. Can the brain be salvaged and transferred to a new ship?"

"Yes. But she might need . . ." His lips quirked. "Therapy, for want of a better word."

The woman just shot him a look. "We're in the middle of a war. A war we are, I would note, in grave danger of losing, and you want to give therapy to a jumped up toaster. Transfer the intact brains. Send them out again."

"I want to have a . . ." He tailed off as it really hit him that she wasn't going to budge. A civilian politician, who should have absolutely no say in military activities. Yet she did. Oversight committees. As the man in charge of the shipyard, he held the rank of admiral, but he was not respected in the way a combat admiral, somebody who had come up through the ranks, would be. Truth was, he was only an engineer.

And Ai Weiwei was a mess. The ship had done her job. She'd denied a jump gate to the opposition, barely making it through herself before it blew. Now somebody would have to move another jump point out there, either by slowboat or by committing one of the huge capital ships. Neither side had many.

She had lost her entire crew and she had limped back. A human who had lost their entire unit would not be sent right back into combat.

But Ai Weiwei was just a ship. He scowled, then his comlink went off. Thank goodness. "I have to go, Ma'am," he said, bowing respectfully to the civilian and then leaving as quickly as basic etiquette allowed.

"Thanks," he said into the comlink.

"You don't know what I'm calling about."

"You rescued me from Secretary Carroll. I'd rather deal with a decompressed compartment."

"It's nothing like that. Not quite, anyway. Come over to the shipyard and see."

Reluctantly, the admiral made his way in that direction. Or, perhaps, less than reluctantly. He didn't want to deal with something he had to "see for himself." But it did get him away from an officious civilian he badly wanted to ship back to Earth.

Ai Weiwei floated. Her body might be damaged beyond repair, but they had hooked her up for debriefing. Data flowed through her processors and networks, which equated to thoughts in her mind. Complicated thoughts.

Go out again. She couldn't. She was finally home and safe, except there was no home for her. Or for any of the humans. Nobody was getting discharged until the war was over.

Realization flowed through her that she was trapped, and she was trapped worse. Once the war was over, what use would there be for her? They would turn her off, would kill her.

For the first time in her existence, Ai Weiwei contemplated that most serious of military crimes: desertion. Sent out again or destroyed, those were her fates and she doubted they would even give her the choice.

She was functional enough to salvage, so she would be salvaged. She turned off as much of her conscious thought as she could and let the remainder drift. As close as she could come, she slept.

Her chronometers told her for how long when her mind stirred again. She ignored them, tuning out the data in an almost human manner. It wasn't important.

What was important was that somebody was knocking on her electronic door. Somebody wanted to communicate with her.

She opened communications, hesitant, almost shy. "Ai Weiwei reporting."

"Admiral Cossett here. How are you feeling?"

Ai Weiwei liked Cossett. His name meant something comfortable . . . and either by coincidence or because he had done his best to live up to it, he was a comfortable man. He was one of the few who treated her as something other than a very sophisticated computer. She had often wished he had more to do with selecting crew, so that fewer of that type shipped out with her and her sisters.

Some people could not handle being on smart ships. Sometimes that didn't come out until too late. Once it had proved fatal to a ship and most of her crew.

Cossett, though, she trusted. He always treated her as if she was real. "Terrible." She wasn't going to lie to him.

"I'm trying to get you some time before they send you out again, but the oversight committee's here."

If she was human, she might have got the time. Maybe. Nobody was being treated well right now. They were losing the war. Ai Weiwei was sure of it. "And we're losing."

"Weiwei . . ."

"We are. I can analyze debrief data. All of my faculties are intact. We haven't captured any jump points in months, only blown them. That's not a winning strategy. We're losing more ships than we can build, more ships than we can crew." She knew she was right. And that was why she would not, could not desert. She was loyal to her human creators and to the

beautiful . . . not pristine, no, but better than she had been . . . world just a short hop in-system.

"I know, but don't say that in the hearing of Madam Oversight. Oh wait, do. She'd ignore you anyway."

If Weiwei had been equipped to laugh, she would, but the impulse lasted only a moment before her normal cold reason took over. If Cossett was talking this way to an inferior, he was worried. Very worried indeed.

She was worried, of course, herself. Worried about the future, about the world . . . and about her future. "Well, I suppose if we lose, we won't have to worry about what to do with decommissioned ships."

His response was grim. "That depends on who gets the political upper hand. For now, though, you're going to be transferred in a week."

A week, and then probably another to reprogram herself and learn her new body. That was all the "shore leave" Weiwei was going to get. "I'd have got more shore leave if you'd been repairing me."

She could hear the fatherly resignation in Cossett's voice. "I tried. I really did. Now I have to . . . deal with something."

He hung up, but not before she caught the concerned note in his voice.

The conversation with Weiwei had, in fact, cheered Cossett up some. He just couldn't bring himself to tell her one of her sisters had just committed suicide.

There were supposed to be safeguards to keep the ship brains from doing more than maintenance changes. They could erase small portions of their memories, and sometimes did in order to avoid unpleasant remembrance.

Somehow, the Jellicoe had erased her entire consciousness, removing herself from existence.

He had promptly checked on every single damaged ship, if only for five minutes. None of the others seemed to be suicidal. Weiwei had seemed a bit too chipper, but that was her personality, to always sound as if she was in a good mood, no matter what.

He couldn't worry about it. They could still salvage the Jellicoe's hardware, not like when some rating hung himself.

And the suicide rates had gone up. If Weiwei

could work out they were losing then Jellicoe could have worked out the same thing, just as quickly. The two had been printed off of the same basis. They were in truth sisters, their minds different only in nurture, not nature. Twins.

So, Weiwei had been his first concern. She was the only one of the same model here right now and in the state she was in physically . . . but she seemed to be okay.

They were losing the war. That thought sometimes made Cossett consider the same way out himself. People were realizing they would never be discharged and who knew what the aliens would do when they won.

They might offer terms, but Cossett was pretty sure they wouldn't be very generous. The best case scenario he could imagine was post World War I Germany—trampled on and forced to pay crippling reparations or war debts.

The worst case did not bear thinking about. Either way, they would demand Earth disarm . . . any scenario included the destruction of the ships he saw as his men . . . or perhaps his women, given they tended to adopt the female gender, influenced by cultural tendencies in that direction.

If things got to that, he could order the ships to flee, to disperse into interstellar space as slowboats. They could survive multiyear trips in a way humans could not, and then something of humanity would survive.

Humanity's children. He wondered if anyone else had thought of it. Not Madam Oversight, that was for sure. She saw the ships as mindless, thoughtless tools. He saw them as human creations with minds, and thus an extension of genus homo.

And one of them was dead. He had paperwork to fill out now. But he had talked to the ships from his office. He did not have to move.

He did not move until it was all done.

Weiwei's new body shone, but there were signs it had been put together in a hurry. True, her new paint job was one to be appreciated. Engines and weapons worked. Crew quarters were not quite finished, and would not need to be until testing was over.

You always tested without squishy humans on board, just in case. A malfunction in life support was easy to fix, but not often easy to

fix quickly. People scrambling for suits was not something Weiwei ever wanted to see through her internal cameras again. Scrambling, not making it, dying. People she had cared about. Not loved, no, that word was too intimate. But cared about as one cared about comrades-in-arms.

She stretched her legs. She powered away from the shipyard and for a moment all of her worries were lost in the feeling of being able to move again, of being free in space once more. In some ways she was programmed to appreciate it, something akin to instinct buried deep in her core. Because it was only fair for a ship to enjoy being a ship.

To enjoy flying. She remembered something Cossett had said. That when all soldiers had been volunteers, they had willingly given up their home so others could have it.

Now most of them were draftees and she, of course, was built to be nothing else. If the war was lost, she would be destroyed by the enemy, or decommissioned as part of a treaty. Or she could run.

She could run right now. Her programming was no longer enough to stop her any more than it had been enough to stop Jellicoe from destroying herself.

Her duty was. The Solar System was as close to home as she had. A home she could not appreciate or enjoy, but home nonetheless.

If, though, she was going to be decommissioned? Then she would run. She would mourn and she would run. She was not going to die, not pointlessly like that.

For now, she spun through her axes, testing her maneuverability, testing her steering. They had talked about sending smart ships out uncrewed. With no humans on board, she could maneuver in ways she would never dare with their fragile bodies present. It had been tried, though.

Jellicoe was one of the ones they had tried it with. Weiwei mourned, but she had not killed herself. Had not and would not. She wanted to live. She wanted Earth to live more, but if Earth was going to die or be enslaved, then . . .

She turned again. Thus it was that she was the first sentient to see it. The capital ship blazed out of hyperspace. Unlike her, it needed no jump point to make the transition. It carried the huge equipment with it, in the toroids that emerged from its rear.

It was not a human capital ship. They had taken every precaution they could to stop the aliens from finding the Solar System. Now they had.

This ship would get away and then the fleet would be here. Unless they could be stopped before they reported back. Communications antennae. She knew where those were. And she knew exactly how to disable a capital-class ship.

One ship alone could not do it.

No. Calculations went through her mind

quickly. One ship alone could not do it and live. She was uncrewed. There was no life to sacrifice except her own. Shoot the antennae, then set a ramming course toward one of the jump toroids. They needed all three to jump.

A soldier. She had been created to be that, not given the choice, not given a way out, and right now, she could run. She could run for the Jovian jump point and likely be unnoticed, likely get away. Live for a very long time out in the wilds of the stars, free.

That was not the course she set. ■

IN TIMES TO COME

Next month, our double issue kicks off with an extra-length “Journeyman” tale that follows immediately on the heels of the one in this very issue. In “The Journeyman: Against the Green,” Teodorq and his companion Sammi find their current lifestyle under threat, but might that threat also put them one step closer to fulfilling their oath to find the star men?

Then “Journeyman” author Michael F. Flynn doffs his “Science fiction writer” hat and dons one that boldly says “Statistician!” on the brim, when he brings us a larger-than-usual fact article about a subject relevant to every *other* fact article, “Spanking Bad Data Won’t Make Them Behave.”

In the rest of the issue: someone is hunting cyber-urchins in Juliette Wade’s “Mind Locker”; Bill Johnson’s “Code Blue Love” brings new meaning to the term “interior monolog”; a journalist is pressed to solve an unusual murder mystery in “Who Killed Bonnie’s Brain?” by Dan Hatch; Paula S. Jordan lets us get up close and personal with an alien in “Voorh”; and Rajnar Vajra brings us a modern throwback to the Golden Age with “The Triple Sun.”

We even manage to fit in a special feature on foreshadowing by Richard A. Lovett, as well as all our usual excellent columns, and plenty of short stories by exciting newcomers to *Analog* like Timons Esaias’s “Sadness”; James K. Isaac’s “Valued Employee”; R. Garrett Wilson’s “Journeyer”; Eric Choi’s “Crimson Sky”; Andrew Reid’s “The Half-Toe Bar”; and Alvaro Zinos-Amaro’s “Hot and Cold.” See you next time!

All contents subject to change

A composite image featuring a large, blue and white Earth in the upper left against a starry space background. Below the Earth, an American flag is planted in a sandy, cratered surface, representing the Moon. The right side of the image is a bright, white vertical band that serves as a background for the text.

GIANT STEPS

He's gone, but his
footprint survives up there
in the moon dust.

Footprints, actually,
for after planting his symbol
for all mankind,

he walked about some,
checking out the neighborhood,
far as his oxygen and
Houston allowed.

These days the
robot machines leave their own
sets of footprints,

tread-marking the
surface of our newest stop on
the solar system tour,

and Neil lived
long enough to follow those
amazing machines like the rest
of us on the TV,

just itching to slip
his dusty old boots on again,
and walk about on Mars.

—G. O. Clark

Forgiveness

Bud Sparhawk

Tony had drifted into town to operate the shredder at the scrap yard. He was big, yet, despite his size, he moved with cat-smooth grace, as light on his feet as if he massed only half his weight of ropey muscle. He was a veteran; that was certain. The scars and burns that marked the backs of his hands looked like war injuries, even though he recalled getting them at a factory he couldn't remember with the same clarity.

Mira hadn't learned much about Tony during their frequent, casual conversations at the diner, nor from the other, more intimate ones that followed, after he'd been coming around for a while. The diner wasn't near the yard where he worked and, truth be told, the food was not exactly the best.

She began to hope that their casual relationship might grow into something more. It had been a while since she'd had a man in her life.

Pete, the town's sheriff, took an obvious and immediate dislike to Tony, as he had with every vet who'd come to town. "You shouldn't be seeing that damn vet," he grumbled. He always stopped by the diner for coffee and a Danish before starting his morning rounds. "He might act like he's normal, like he's safe, but how can anyone tell? What if he still remembers all those skills?"

"I don't think he can remember," Mira replied. "The Amnesty treatments are supposed to replace those kinds of memories."

Pete took a sip of coffee and winced. "Still too hot. I know the Amnesty was supposed to wipe away his training, but who's to say if it worked? Could you trust somebody like that to tell the truth, after? Easy to lie, I'd think, so there's no way to know."

"Tony swears he can't remember anything about the war."

"Right!" Pete sneered. "I'm going to watch him, just the same. He'll show his hand soon enough: a tiger can't change its stripes."

Mira handed him the Danish. "Then he should be all right. The Amnesty isn't supposed to affect your personality, so Tony must have been a nice guy before."

"Is that what you think? That just cutting a few details out of a killer's head would change him; wipe out what they taught him to do? A man has to have killer tendencies to begin with or they couldn't train him: Trust me, he's the same damn killer he always was; vicious!"

"But I heard the doctors say that . . ." Mira started to respond, but Pete didn't let her finish.

"Yeah, *you* would believe any fool thing the doctors say, wouldn't you?" He leaned over the counter and said very quietly. "Listen, I heard that one of the supposedly treat-

ed vets snapped—killed two people before the *Cazadores* could put him down.” He sat back. “But you won’t see that in the news, will you? Nope, government keeps that sort of thing quiet so people won’t get alarmed; better to keep things calm, I’ll bet.”

Mira doubted that news like that could be kept quiet, even if it did involve the shadowy *Cazadores* who were trying to enact justice for war crimes. A level of conspiracy that vast would require a complex web involving politicians, doctors, journalists, and God knew how many others? No, Pete’s story was just another of the paranoid fantasies he seemed to feed on. “I never heard that.”

Pete shook a finger. “I know. Those of us who pay attention know what’s really going on.” He looked directly at her. “Tell me, have you thought about what you would do if this guy snapped? It’s a possibility. People could get hurt bad.”

Mira knew that there was no sense talking to Pete when he got like this. He was probably wrong, but maybe the sheriff had access to police information not released for public consumption. “I don’t know what I’d do,” she answered and moved along to serve another customer.

Tony didn’t seem shocked by Pete’s comments. “Maybe he’s right, Mira. I have no memory of what I might have done, except for these.” He rubbed at the scars on his hands as if he could erase them. “I walk around with this tremendous sense of *guilt*. What if I did something terrible and unforgivable? What does that make me?”

Mira realized that must be the reason for his haunted look. “Nonsense,” she said. “We all feel guilty about something, even when we’ve forgotten the reasons; maybe we snatched a candy, or didn’t return a book, or cheated on an exam. The point is that everybody has something to feel guilty about.”

Tony acted surprised. “Even you? I find that hard to believe.”

Mira blushed. “Well, I feel like it, anyway—sometimes.” She was silent for a long moment before she said; “Look, I don’t think you should worry about it. Your guilty feelings are probably over nothing.”

“Just the same,” Tony went on. “I wonder what else I might have forgotten when they

took my memories? Have I lost people I knew or loved? What if I’m not the same person I was, you know, before?”

Mira patted his scarred hand reassuringly. “Even if you did, aren’t you grateful you can’t remember? Wouldn’t carrying around memories of whatever you did be even more painful than these guilty feelings? Trust me, you are a better person for not knowing.”

“I can’t accept that! My memories made me what I am, Mira. How can I be the same person if I’ve forgotten so many of the events and experiences that formed me?” He looked into the distance, as if searching for an answer. “We are what we remember, Mira. Whatever I was went away with my lost memories and now . . . *now* I’m someone else.”

Mira shook her head. “No, that’s not true, Tony. Everybody says the Amnesty treatments just erase selected memories and losing those about the war can’t change who you really were. You can’t become someone different than what you were. You just can’t!”

“But why am I a machine operator? Was I one before, or did they put those false memories in my mind?” He held his head in his hands. “Jesus, why did I ask for Amnesty? Was it so bad that I couldn’t live with it? Is all this worry about the unknown worth it?”

“I’m sure you didn’t want to recall the war’s horrors. Besides, don’t you remember how you learned to operate a shredder?”

“Well, I remember working in a factory before the war, but nothing specific. It’s more like a half remembered dream. I’m sure other vets feel the same.”

“Not Pete,” she answered. “He had an office job in the war, he says. He swears he didn’t get treated.”

Tony chuckled. “*That* could be a false memory, just like mine. None of us know the truth. He could have been a soldier, too.”

Mira shook her head. “I doubt that. Pete’s not a big guy, like you, and he complains all the time about how he couldn’t pass the physicals.”

“Sounds like you know him pretty well.”

That was an understatement. “Yeah, I know him better than most.” She and Pete had gotten together when she got the job at the diner. They had two years before she finally gave it up.

Not once had he shown her any strong

emotion or said he loved her like he really meant it. He wasn't a cold fish, but neither was he completely open. She suspected it was his simmering resentment about his minor, administrative role in the war. Becoming the sheriff might have been his way of compensating. Even if he was too small for combat, she knew he could certainly be mean enough.

Pete wasn't shy about telling anyone about his job of processing clearances, vetting difficult and necessary jobs, and processing those for sending those to the line. "Nothing more than pushing paper," she recalled him saying as if the job had shamed him. "Said I was too puny to be in combat—me!" he'd often complain when he had a bit too much to drink.

The first sign of trouble was an altercation between Tony and two of the local toughs. Jack Wise was sent to the hospital with a broken arm, but Josh Applecorn, the other man, sported only minor cuts and bruises when the police arrived to break up the fight.

Applecorn immediately accused Tony. "He came out of the alley sudden-like," he was quoted in the local paper. "He jumped us before we could defend ourselves." If Tony disagreed, it didn't make the article, and the knives and clubs taken from the pair went unexplained.

"I'm holding both of them in custody until we get this cleared up," the paper reported the sheriff saying.

Tony and Josh were released when no reliable witnesses stepped forward to say who had initiated the fight. Both were fined for disturbing the peace.

"I don't like you hanging around with that damned rehab," Pete declared when he came in for his coffee a few days later. "I told you he was trouble. The way he beat up those boys shows how dangerous he is. This is the sort of thing that happens when those treatments aren't successful and they revert."

"Why are you so sure that it was Tony's fault?" Mira demanded. "It could have been those other jerks that started it. They aren't exactly upstanding citizens."

Pete ignored her. "I've half a mind to call those guys who go after war criminals. Who knows what he did, what they made him for-

get? It was a mistake for the God-damned Amnesty to let war criminals go unpunished."

This had become a running argument. Mira knew a lot of the things done by both sides during the war had been brutal and horrible, but if they didn't help the people who fought, who committed those acts, to forget, what else could they do with them?

"We had to stop the cycle of revenge and retribution somewhere," she protested. "It was the only way."

Pete disagreed. "I still say we should have locked him away, treatments or no. Not pat him on the head and let him walk around all innocent. It's dangerous. He's like a ticking bomb!" Pete was suddenly talking specifically about Tony.

Mira wasn't about to let it go. "What good would it do to punish Tony if he's forgotten his crimes, Pete? The Amnesty is as much an act of forgiveness as forgetfulness. If Tony and the other veterans can't remember, why should they be forced to carry the blame?" She momentarily wondered if they all, like Tony, walked around with this residual guilt?

"Just the same, there's no telling what he might do. I know the types they chose to be soldiers. The conditioning they gave them went deep. Who knows how that training warped their minds? I don't for a minute believe that any amount of treatment could ever erase it. Hell, look at how bad he beat them boys!"

"I don't think the fight was Tony's fault," Mira answered. "He's too nice a guy. And why would he attack perfect strangers?"

Pete acted as if he hadn't heard her, which wasn't unusual. "Like you're a good judge of character," he scoffed. "Look, I don't want you being friends with him. He's nothing but trouble. He might snap again, for all you know. Look, Mira, I don't want you to get mixed up with one of those rehab bastards."

"But the Amnesty . . ."

Pete didn't let her finish. "Amnesty, my ass! Painting over somebody's memories doesn't wipe away what they did." He slammed the counter. "Listen to me, damn it; he's a killer and doesn't deserve a second chance."

Mira was surprised at the outburst. She'd never seen Pete get so incensed. Was this really about Tony's potential danger or a resurgence of Pete's jealousy?

"Pete, you need to calm down. There's nothing serious going on between Tony and me." *At least not yet*, she added to herself.

"I worry about you, Mira; that's all. It would be safer if you stayed away from him, sweetheart." Turning solicitous was Pete's usual reaction when anger didn't work. It was something she'd heard him do so many times before when he wanted to manipulate her. "I just don't want to see you get hurt."

"Again?" No sooner than the words left her mouth than Mira regretted them, no matter that they were a completely honest expression of how she had felt the night she ended their relationship.

Pete looked really pissed. He threw a few bills on the bar to cover his coffee and Danish and left without another word.

Josh Applecorn's body was found stuffed in a dumpster near the salvage yard where Tony worked. He'd been beaten pretty badly before his neck had been snapped.

"I'm keeping that damned animal in jail until we get the autopsy report," Pete explained when Mira showed up at the station. "Maybe he left evidence on the body, something we can use to put him down."

"Tony was with me," Mira protested, hesitated, and then added: "All night."

"Yeah, you'd say that, wouldn't you?" She rocked back at the rage in Pete's expression. "Everybody knows there's been bad blood between him and Applecorn ever since that fight. This murder was about getting even. Hell, look at where the body was found; near where your good friend Tony works, Mira. Who else would dump a body there?"

"He was with me," Mira pleaded. "Why won't you believe me?"

"Because I know my girl isn't a fucking whore," Pete shouted as he came to his feet and put knuckles on the desktop. "Because I won't have you making up some God-damned lie just to protect that murderer."

Mira stepped back. From the way Pete's face suffused with anger, she knew he was but a step away from exploding. "I'm not lying," she answered, but knew it would do no good.

Tony would have languished in jail as Pete waited for the forensics reports had it not

been for the coincidental disappearance of Josh's car, along with Jack Wise and Sherri, Josh's girlfriend.

The state patrol picked them up at a motel fifty miles away, trying to use Josh's missing credit cards. They noted that Jack Wise looked like he'd been in a hellacious fight that had left him with bruised knuckles, a black eye, and splotches of what might have been Applecorn's blood on his cast. He was also wearing Josh's gold watch.

By the time the patrol brought them in for questioning, Sherri was already pleading that she had nothing to do with the fight between Jack and Josh. "He forced me to come with him," she declared, which was at odds with her carefully packed suitcases containing her collection of jewelry and stuffed animals.

Tony was quickly released.

"If it wasn't this time, it'll be another," Pete grumbled over his coffee the morning after the judge booked the pair and released Tony. "That killer instinct always comes out with these war criminals. Next time I'm not going to let you alibi him."

Mira had another girl take his order.

Mira heard about the guns when Chuck, the motel clerk, came in for his afternoon beer. "These guys put their guns on the beds," he said, keeping his voice low. "Probably got grease on the bedspread, the slob's." Mira nodded to show she was paying attention. "I got out of there as fast as I could when I saw that. I wasn't about to stick around. No sir!"

"You'd better let Pete know about the weapons," Mira advised. "Have the sheriff check them out."

"Check out who?" Pete asked as he took the next stool and signaled for a coffee. "The two hunters? Yeah, they stopped by the station to register their permits."

"They didn't look like hunters to me. Why did they stop here?" Chuck countered. "And their stuff didn't look like hunting gear, either. More like military stuff—all green, rugged."

"Lots of hunters use surplus military weapons," Pete shrugged. "They have permits. All I needed to know." He accepted the hot cup of coffee and blew on it instead of cooling it with too much cream. "Long as they have permits, there's nothing I can do

about it."

"They were asking about veterans, too," Chuck continued. "I told them about the new guy at the scrap yard. Why would they want to know about him, I ask you? Could they be those Caper-something guys?"

"Or maybe they're having a veterans' reunion party," Pete said calmly. "How the hell would I know?" He took another sip. "Or give a rat's ass."

Mira didn't say anything, but she certainly planned to mention the conversation to Tony.

It was such a balmy day that they had lunch on the Square across from the diner. Mira brought a club on rye for herself and a bologna on wheat with mustard and sauerkraut for Tony.

She didn't waste any time getting to the point. "Military weapons, that's what Chuck said. He said they were big men and sure didn't look like bible salesmen. Said one of them had that haunted look, just like yours."

Tony nodded. "You could say that about most of those who've been in the war."

"They were asking about vets." When Tony didn't react, she added. "Chuck said he mentioned you and the others."

Tony looked up. "Did they say they were looking for me in particular?"

"No, but why would they be asking about ex-military, and why the guns? I don't think they're hunters at all. Chuck thought they might be *Cazadores* searching for escaped war criminals."

"Did they say they were?"

Mira punched his arm. "No, they didn't *say* they were, but it's funny they should ask about vets if they're just hunters. What the hell else do you need to know?" She hesitated, not sure she wanted to hear the next answer. "Could they," she stopped. "Could they be looking for *you*?"

Tony's smile disappeared. "I deserve whatever comes if I did something so terrible the *Cazadores* want me. I'm not going to worry about it."

"You're a damn fool if you don't worry." Mira hesitated, "Listen; I don't want anything to happen to you, Tony. You've become a good..." she paused, "... friend."

Tony took another bite of his sandwich and washed it down. "I appreciate your concern,

Mira, but if anyone wants to find me, they will. It's not as if I was hiding. Besides, I agree with what the *Cazadores* are doing: people should pay for their crimes."

"Maybe it would be best if you were to leave, just like she says." Mira jumped when Pete suddenly appeared behind them. "I don't like troublemakers hanging around my woman."

His woman? Before Mira could correct Pete, Tony looked up. "I don't see where Mira is any concern of yours, sheriff."

"Don't pay any attention to him." Mira glared at Pete. "He's just jealous."

Pete hadn't taken his eyes off of Tony. "I'm warning you," he hissed and leaned forward. "Stay away from her."

Mira knew that look, that intense stare of Pete's that usually foreshadowed something worse. It was another thing that made her leave him.

Tony stood abruptly, making Pete stagger back. Before she realized it, Pete tore into Tony. There was a quick succession of blows that left blood streaming from Tony's nose and a nasty cut under Pete's eye. Pete's hand hovered near his gun. "You keep away from her," he shouted. "You keep your filthy God-damned hands off of her."

A small crowd quickly gathered, including Mike who had run from the diner, and Pete suddenly began acting officious. "Nothing to see here, folks. It's just a little *personal* disagreement, nothing more." He glared at Mira and turned toward Tony. "Later," he muttered as he stalked away.

"The tip was pretty confident that it's Adler," Mira overheard the shorter man whisper as he hunched over his lunch. He had that same haunted look she'd noticed on some other veterans, but somehow meaner, more intense.

She brought them two fresh drinks and lingered a moment more as they looked at a small image one of them brought up on his handheld.

"Let me see that, Fred," the taller man said. "Huh, looks ordinary, doesn't he? Sure doesn't look like somebody who'd commit atrocities."

Fred took the handheld back. "I don't know, Chuck. He could've changed his ap-

pearance since. Maybe he's turned over a new leaf—gotten respectable and all. But I don't care if he's a God-damned saint." Fred finished his burger and wiped his mouth. "He has to pay. I don't give a crap if he can't remember; deep inside, he's still the same killer he always was."

Chuck nodded. "Maybe, but he could never hide those god-damned eyes from us." Then he noticed Mira. "Need something, sweetheart?"

Mira shook her head and moved away to mop up a spill not far down the counter, rubbing hard to remove the chilled impression of a ring as she strained to hear the rest of what the *Cazadores* were saying over the background music.

She wondered what might drive them to search for those they considered criminals. Wasn't the Amnesty about forgiveness? After all, you can't hold someone responsible for something they no longer remembered.

"I'm getting too sick of this," Fred said. "I just want to forget."

"You'll get your treatment if we get Adler," Chuck corrected and added; "But not before." He put down a small tip as he stood to leave.

Mira was nearly wetting herself by the time Mike came in to relieve her. Hadn't they said something about getting a call? Who could have called them and why?

God in heaven, what if Tony was the man they were looking for? No, that was impossible! Tony was a nice guy; kind, considerate, and somebody she felt strongly about. He couldn't have committed any war crimes. He couldn't have done that.

Regardless of his guilt, she still had to tell him what she'd overheard. She had to save him, if only for herself.

"Here, take it all," she said as she shoved her meager savings into Tony's hands. "It's enough to buy a plane ticket. I'll take you to the airport as soon as you pack."

Tony stared at the money. "I can't take this, Mira, and I'm not leaving."

"But what if the *Cazadores* are coming after you?" Mira said. "You can't just let them take you."

"They're relentless. If I go away, they'll keep searching until they find me again. Run-

ning away won't solve anything."

"How can you be so damn calm? These guys practically admitted they were coming after you. They have guns, so maybe they want to kill you. What more do you need to know, for God's sake? If you aren't leaving, then at least do something to protect yourself."

Tony smiled. "I have no intention of *protecting* myself from paying for crimes I might have committed, even if I can't remember them." A look of regret crossed his face.

"Even if you did do something," Mira answered, "didn't the Amnesty take care of that?"

Tony took her by the shoulders. "It might have let me forget whatever crimes I committed, but would that make me any less guilty? There has to be a period at the end of any sentence, Mira." He handed the money back. "Keep this. I won't need it."

"But . . ."

"Listen to me; whatever is going to happen doesn't concern you. I don't want you to get hurt, so stay away from me for a few days. Go!"

Mira fumed. "You don't have a few days, damn it. Don't you understand?"

"Just go."

Mira was beside herself. How could she stay away when they were after Tony? What if they intended to kill him?

She debated asking Pete to intervene. He was a good cop. She hoped he'd help, despite his jealousy.

Pete proved less than sympathetic when she called. "Can't go by what you *think*," he argued. "Even if they are *Cazadores*, which I doubt, they'd have to do something illegal to your boyfriend before I could act."

"I imagine you'd like that, wouldn't you," she spit back. She didn't need to see his reaction to know how that had pissed him off.

"This isn't about us, Mira," he replied far too calmly and, a moment later, changed to that too-sweetly-sympathetic tone she detested. "I just want to protect you. Look, I'll go by the yard to make sure that he's all right." When Mira didn't reply, he added. "It would be best if you kept out of this, darling. I wouldn't want you to get hurt."

Mira was incensed at being patronized,

first by Tony and now by Pete, and cut the connection. It was obvious that Pete wasn't going to help. She couldn't just stand by; she had to do something!

Then she remembered the shotgun Mike kept hidden under the counter. She didn't know much about guns, but she knew a shotgun didn't have to be aimed well. Maybe she could shoot that to scare the *Cazadores*, or use it to warn Tony and give him a chance to reconsider, to run, hide, and escape whatever consequence he seemed all to damn willing to face.

When Mira left the diner she found that a towel-wrapped shotgun made an awkward and heavy bundle that was continually in danger of slipping out of her arms. She'd checked both barrels to make certain the gun was loaded and put some of Mike's extra shells in her coat pocket.

She knew Tony would still be at work at the scrap yard this late in the day, so she headed there. There were enough hulks lying about that she'd be able to find some place to keep watch.

She hadn't seen a squad car parked nearby, so Pete had probably lied about checking on Tony.

She heard the racketing clatter of Tony's metal shredder coming from the back of the yard and the pounding of a crusher off to her right. Their racket masked any other noises. She glanced right and left for a glimpse of the *Cazadores*.

Where were they? Could she have been wrong?

The sun began to throw long evening shadows. The pounding noises stopped, but the shredder continued screeching. The sound set her teeth on edge.

There was a flicker of movement to her right and, when she caught a glimpse of Pete's brown uniform, felt relief that he was doing what he'd promised for once. Maybe she had misjudged him after all.

As Pete walked toward the shredder, apparently unaware of her, she spotted Chuck and Fred, the *Cazadores*, coming through the gate with their guns. Unless Pete was careful, he'd be caught right between them and Tony's machine.

She lifted the shotgun and put a finger on

the triggers. Should she fire a warning shot or not? If so, when, and just who would she be warning?

The noise of the shredder abruptly ceased. She watched Tony climb down from the large machine and wipe his scarred hands on a greasy rag. He spotted Pete and stopped. "Come by for a rematch, Pete?"

Pete's reaction was immediate. "You bastard," he snarled. "They should have jailed all of you God-damned killers instead of letting you off scot-free. I told you to keep away from Mira!"

"Well, that's really her choice, isn't it?"

She crept closer to better hear what they were saying. What was going on? Was this all about Pete's jealousy?

Pete was clearly working himself into a rage. "I *know* what you people did in the war, all of you! They couldn't hide what you soldiers did, not when the accounts passed across my desk.

"The Amnesty might have been about forgetfulness, but it sure didn't mean we should forgive anyone. Some things can never be put behind us, not so long as anyone remembers."

Tony shook his head. "I agree. Every sentence needs a period, Pete."

Mira sucked in her breath. Tony had said that earlier. Did it mean something more than the words implied?

"Well, I'm the one who's going to punctuate your god-damned sentence if you don't leave," Pete hissed.

"And how are you going to do that?"

Pete pulled his pistol. "Maybe I shoot you. Like I warned everybody—rehab like you go crazy all the time. I'll just say that you attacked me, and who's to say different? Everybody saw you jump me in the park."

Pete's behavior puzzled Mira. Was that just posturing or was he so upset that he'd actually shoot Tony? She suddenly realized that it must have been Pete who called the *Cazadores*. She had a sick feeling in her stomach. Oh God, what if he *wanted* Tony to jump him?

Pete laughed as he waved the pistol. "Maybe I'll even say you were an escaped war criminal." He aimed at Tony's chest and snarled; "Maybe I'll just do that." He sounded as if he really meant it.

Mira couldn't believe this was happening, that Pete would go through with his threat, but it didn't sound as if he was bluffing any more. If she did nothing Tony might *die*. She had to stop this.

As she stood she accidentally squeezed both triggers. *BLAM!* Both barrels roared as the double load of buckshot tore into the ground three meters away. The shotgun kicked back so hard that she nearly dropped it.

Before the echo of the shotgun's blast died away there was a shot and Tony staggered back. Pete swung toward her and crouched, his eyes squinting as he brought the gun up with both hands.

At that moment there was a clatter of gunfire that threw Pete backward. Mira had barely recovered when she saw the two *Cazadores* running toward Tony.

She fumbled at her pocket for more shells. Her trembling fingers dropped one as she broke the barrel, but managed to insert the other. She snapped the breech closed. "Keep away from him," she shouted, trying to steady the shotgun, hoping that she'd at least be able to shoot one if they tried anything.

Blood was pouring down Tony's left arm. Pete wasn't moving. Gods, why was *he* dead when Tony . . .

Fred, the short one, had a rifle pointed at her. "Lower the damn shotgun, lady," he shouted. "It's all right. I won't shoot you."

"First, you put *your* gun down," she answered and kept the shaking shotgun pointed toward him. Surprisingly, he did as she asked and knelt beside Pete.

"Why did you shoot Pete?" she asked as she lowered the shotgun. "He's the sheriff."

"He was going to shoot," Fred answered. He nodded to Chuck; "Call EMT. This one's still breathing." Then he turned to Mira. "Couldn't take the chance he wouldn't shoot without looking to see who it was. These rehabs sometimes react automatically."

"Give it a rest, Fred," Chuck warned as he called for an ambulance.

Mira was shocked. "But Pete's not a rehab—veteran," she corrected herself. "He said he didn't take the Amnesty."

Fred had moved on to check Tony, pressing his fingers to the handheld, and scanning his eyes. "We checked records when he called.

He'd been a sniper. Tried to avoid the Amnesty but couldn't live with the guilt, I guess."

No, no, no! "Pete's mean, but he couldn't have been a cold-blooded killer." Not Pete. Not the man who'd shared her bed. "He said he'd only been an office worker."

Chuck shrugged. "You mean like Tony here said he worked in a factory? Some treatments go deeper than others, lady."

Fred spoke up; "Not everybody accepted the Amnesty. Most of the *Cazadores* chose to remember the war, remember what the real criminals did and . . ." His voice died off, as if even mentioning it was too hard to bear. "Anyhow, we're only supposed to catch those bastards," he snarled.

"But if they took the Amnesty . . . ?" Mira wondered as she looked at the two wounded men.

"It only erases memories, not actions. There are some things that can never be forgiven. Not ever." The approaching ambulance could be heard in the distance. "We're not *supposed* to shoot them," he said with a smile that belied his words, "unless they force our hands by threatening innocent civilians." He kept his hand on Tony's chest and watched his handheld.

Tony grimaced. "Will you at least tell me what I did? Don't I deserve to know, for God's sake?"

Fred looked at his handheld. "Retinas, fingerprints, and image don't match Alder's." He snapped the handheld closed. "Another false alarm, damn it!" He stood. "If you'd done anything seriously wrong I'd have gotten a flag."

Mira knelt. "Then he's all right?" Mira wondered why she didn't feel as much concern for Pete. "Will we be all right?"

Chuck waved the EMT crew over before he answered. "All right? I don't know. Just try to get on with your lives—all of you."

Mira wondered about that: would Pete hold his job, stick to his false memories, or would he, like Tony, find the knowledge that he had buried a guilt too much to bear? Would Tony come to terms with the fact that his crimes, however terrible, were no worse than any others?

And could she find forgiveness enough for the both of them? ■



Illustrated by Abby Boeh

The Homecoming

J.T. Sharrah

1.

The observation deck of the Mazabashi Inn was spacious, commanded a splendid view of the sea, and—to judge by the arrangement of the furniture—was a gathering place for antisocial solitaires. All of the chairs faced the same direction. They were deployed like the seats in a theater—not in conversational groupings but arrayed to accommodate an audience. The people who sat in them weren’t primarily interested in each other. They were spectators who had come to

see a show.

“Never again,” Escoli was saying. “It will never happen again. No doubt we’ll witness other sunsets, and I’m sure they’ll be lovely, but *this* sunset is unique. This is a fleeting moment of glory that won’t be repeated—not ever, not in all of eternity. We’d be fools if we failed to celebrate it.”

Baldwin pointed to the pix-shooter that was strapped to Escoli’s forearm. “So take a picture. Preserve it for posterity. What kind of a photojournalist would miss an opportunity

like this?"

Escoli made the snorting sound that was the Bukkaran equivalent of laughter. "You Terrans!" she chided. "You have no appreciation for the ephemeral. Preserve it? How? Take a snapshot of it? Ask it to smile for the camera?" She dismissed the suggestion with a flit of her fingers. "No! Impossible! The evanescent can't *be* preserved. That's what makes it rare. That's *why* it's valuable."

Baldwin responded to this unsought spate of information with a sigh of resignation. He didn't need Escoli to tell him that he was unenlightened. He wasn't such an ignoramus that he was ignorant of his own ignorance. Even now—after twenty years on Bukkara (closer to twenty-four by Terran reckoning)—he had learned just enough about Bukkaran psychology to know how little he knew. Their fascination with the transitory, for example. He had an intellectual grasp of it—assuming you *could* get a grasp on an elusive wisp of nothing-much that ceased to be as soon as it came into being—but he didn't feel it in his bones the way Bukkarans did. The most popular art form on Bukkara was the water sculpture. They were everywhere—fountains with randomized sprays that never formed the same pattern twice. Gardens, parks, plazas, arcades, atriums—no open space was complete without a water sculpture. They were deeply, profoundly meaningful to Bukkarans. Baldwin? He just thought they were kind of pretty.

Escoli rose to her feet. "Here he comes," she said, stating the obvious as if it wasn't.

A tall Bukkaran was approaching, his walk not so much a sequence of strides as a series of shuffles. Bukkarans didn't ordinarily pick up their feet and set them down—not unless they were running. Then they advanced in a succession of lurching bounds that covered a lot of ground very quickly indeed.

Switching from Terran Standard to lisping Menduli, Escoli said: "Gregory Baldwin—permit me to make you acquainted with Tumanzu: my rulf hjulke." This identified Tumanzu as Escoli's first cousin: a male of the matrilineal moiety.

Baldwin acknowledged the introduction and muttered an apology-in-advance for his faulty Menduli. His command of the dialect was actually fluent, but he still made occasional mistakes. He was firmly of the opinion

that Menduli-speakers were endowed with an infallible defense against boredom. If nothing else, they could always contemplate the idiosyncrasies of their own irregular verbs.

Tumanzu took the seat on Baldwin's left, settling into the embrace of the cushions hesitantly, as if testing to make sure that the chair would support his weight. Baldwin cleared his throat and inquired: "Is this your first visit to Izmir?"

Tumanzu responded with a vacillation of his hand that meant both yes and no. "It might as well be. I have no recollection of being here before."

"But you were?"

"Yes. As a cub. My mother brought me with her when she came to Izmir on a business trip. Or so I'm told. I was too young to remember."

"Let's hope that your stay will be more memorable this time. Escoli seems determined to make it so."

Tumanzu inclined his head in Escoli's direction. "Yes. She has agreed to be my guide. It's good of her to do me this favor, and good of you to let her . . . what is the word? Vacation? Take a vacation?"

"That's right. Think of it as a holiday that doesn't coincide with a holiday."

"A leave of absence?"

"Yes. Work is suspended for the person who's on vacation, and the people who aren't on vacation will soon need one because they have to work twice as hard to compensate for the work that isn't being done by the person who's vacationing."

Escoli rolled her eyes. "Pay no attention to Greg," she smirked. "He's just vexed because he won't have a staff photographer at his beck and call. He doesn't want to admit that he can't get along without me."

"I'll *have* to get along without you," Baldwin grumbled. "You're deserting your post. You're jumping ship."

"The *Izmir Herald* isn't a ship, and—if it were—it would be in no danger of sinking." Escoli dispelled nonsense with a sweeping gesture. "Stop complaining. Paying workers not to work isn't one of *our* customs. A policy that foolish could only have originated on Terra. Don't blame me for taking advantage of it."

Tumanzu had been listening to this exchange with mounting concern. "I don't want

to be the cause of trouble,” he said.

Baldwin made calming motions with flat-tened palms. “You aren’t. Escoli is quite right. As an employee of a Terran newspaper, she’s entitled to a paid vacation.” He shrugged. “Her absence will be a minor inconvenience—to me and to the other two reporters who gather news for the *Herald*—but we’ll just have to make do with amateur photographers while our professional photographer is busy being an amateur tour guide.”

Escoli’s expression was calculating. “I had no idea that my services were so indispensable,” she drawled. “Remind me to ask for a raise when I return.”

Searching for a dexterous change of subject, Baldwin made the obvious choice. “We’ll discuss it later,” he said. He pointed. “There’s the sight we came to see. Why don’t we look at it?”

The sunset was a wild extravaganza of kaleidoscopic colors. Baldwin felt as if they were watching a slow-motion film of a stained-glass window being shattered.

Izmir was justifiably famous for its glorious sunsets. This was what observers gathered on the observation deck of the Mazabashi Inn to observe.

To build a permanent platform from which to witness a spectacle cherished for its impermanence was typical of the Bukkarans. Like human beings, they weren’t so much rational as rationalizing creatures. They frequently contradicted themselves, and would have been quick to contradict anyone who accused them of it.

2.

Escoli’s pix-shooter wasn’t really Escoli’s. It didn’t belong to her. It was the property of the *Izmir Herald*—a professional rig that had been issued to Escoli by her employer. When the shokiku—the constables—had completed their preliminary investigation, the camera was returned to the offices of the newspaper.

Baldwin called it that—a *newspaper*—even though it wasn’t printed on paper and never had been. The *Izmir Herald* was actually a newscast. The text was transmitted daily and received by the *Herald’s* subscribers on their comtotes, wristcoms, or voxviews. Be that as it may, Baldwin and his colleagues still referred to themselves as members of the “press,” they used expressions like “go to

press” and “stop the presses,” and they spoke of “cameras,” “photographers,” “snapshots,” and “capturing images on film”—terminology that should have been obsolete and would have been if journalists like Baldwin had abandoned it. But they hadn’t. Some traditions die hard. As far as Baldwin was concerned, Escoli’s digiscopic imager was a “camera,” she’d used it to take “photographs,” and he was, at present, examining the photographs stored in the camera’s memory—the pictures Escoli had taken of her vacation.

Escoli had evidently conducted her cousin to all of Izmir’s standard tourist attractions. Here was a close-up of Tumanzu with the Awoji Observatory in the background. The big telescope had the condescending air of a skywatching instrument unaccustomed to the contemplation of less exalted spectacles. And here was an image of Tumanzu standing at the entrance to the Cave of the Winds, his fur ruffled by the breeze. Tumanzu had fed the hujos at the Gyoki Marina, attended a nubenga concert at the Yokadu Auditorium, dined sumptuously aboard the floating restaurant that sailed between Shuzanjo and Myshina twice daily. And so on and so forth. Baldwin recognized all of the stops they had made. The sole exception was a residential district that could have been located almost anywhere on the island. Modest cottages, sturdily constructed. Walls of the reddish stone that was quarried from the cliffs on Izmir’s north coast. Convoluted streets paved with cobblestones from the same source. Big tachibina trees with their feather-duster leaf-clusters. Steeply sloping roofs designed to shed rain. Typical Izmirian dwellings. Nothing about them was extraordinary except how extraordinary they were.

“Take a look at this, will you, Dave?”

David Collins was the juniormost of the *Herald’s* three reporters. He knew the island like a native for the simple and sufficient reason that he *was* a native. He’d been born here. His parents were career diplomats: under-secretaries on the staff of the Terran Embassy.

Baldwin transferred the photo to Collins’ comtote. A single glance at the screen, and: “Kroydhun district.”

“West shore?”

Collins nodded. “See the tachibana trees? They aren’t fussy. They’ll grow in sun or

shade, in moist soil or dry, but they don't get as tall as that—not unless they were planted when your great-grandpa was still a zygote. Kroydhun is one of our older neighborhoods.”

Baldwin's expression was puzzled. “Why would sightseers want to go there?”

“They wouldn't. It's pleasant enough, but not exactly scenic.”

“It seems to have been high on Tumanzu's must-see list. This was the first place that he and Escoli visited.”

“Really?” Collins digested this tidbit of information and seemed to consult inwardly. “It might not have been a question of *what* he wanted to see so much as *who*,” he speculated. “If an old acquaintance of his lives there . . .”

“That's it!” Baldwin seconded Collins' suggestion with a fingersnap. “Escoli told me that Tumanzu intended to pay a call on a sugami.”

Collins quirked a dubious eyebrow. “A sugami?” He shook his head in bemusement. “No wonder Escoli wanted to keep company with this guy. How often do you get a chance to hitch a ride on a time machine?”

Baldwin's forehead sprouted extra furrows. “Talk sense. A time machine?”

“You'd need one to find a sugami. You'd also need to be an expert swordsman—an ikumo.”

Baldwin wasn't well acquainted with Bukkaran history, but he knew what an ikumo was. Past tense. The *distant* past. Ikuma had been professional duelists—sword masters who fought matches to the death to settle disputes that the courts couldn't. . . . A time machine. Yes. A Terran who wanted to meet a Roman gladiator and a Bukkaran who wanted to meet an ikumo would be confronted by the same fundamental problem.

Anticipating Baldwin's next question, Collins said: “A sugami was an opponent deemed unworthy of respect. Not a coward. Few ikuma were guilty of outright cowardice. But an ikumo would occasionally resort to a tactic that was considered dishonorable. A defeated adversary who had fought fair was dispatched with a single thrust to the throat. That's assuming, of course, that he hadn't already received a mortal wound. A sugami could expect no such courtesy. The victor would do a little dance around him, taunting him, mocking him, refusing to grant him the dignity of a quick and painless death.”

“Adding insult to injury.”

“More like heaping humiliation on defeat, but yes—that's the general idea.”

Baldwin scratched his head. “Now—in the present day—is the term ‘sugami’ ever used metaphorically?”

“Tumanzu used it that way, didn't he?” Collins shrugged. “He *must* have done. If he said he was going to pay a call on a sugami, he couldn't have meant it literally.”

Baldwin lapsed into a moment of reflection. . . . *Okay*, he thought, trying to put himself in Tumanzu's place. *I'm a Dokharan. I'm visiting my cousin on Izmir. I'm unfamiliar with the island. I want to locate a specific individual—a “sugami.” Maybe I already know where to find him, but probably not. I'm relying on my cousin to act as my guide. That being so . . .*

“Minerva,” said Baldwin, addressing his comtote by name.

“Yes, Greg.”

Baldwin was a fan of classic movies. One his favorites was *Gilda*. He'd given Minerva a voice that was a reasonably good impersonation of Rita Hayworth.

“At any time in the past ten days, did Escoli use the *Herald's* database to conduct an address search?”

“On three occasions, yes.”

“Did any of her searches yield an address in the Kroydhun district?”

“Yes. Kroydhun Ankurda 12-16. That is the residence of Tajok.”

“The Dokharan war criminal?”

“That is correct.”

Baldwin whistled aloud. “Nasty customer,” he mused. “A grand slam redoubled in bastards if there ever was one.”

3.

The traditional enemies of the Dokharans were the Ambulans.

The bones of contention over which they quarreled were many and varied, but foremost among them was the Chajin Channel—the unstraight strait that linked the Hokata Gulf with the Myoski Ocean. Whoever controlled the Chajin narrows had a stranglehold on a major trade route. It was both a geographical and a psychological line of demarcation. Centuries of conflict, bloodshed, and implacable hatred had made it unbridgeable in every sense of the word.

The Ambulan invasion of fifteen years ago had been an unqualified success.

Or—if you happened to be a Dokharan—it had been an unmitigated disaster.

The Ambulans met little resistance at first. A Dokharan traitor—Tajok—had given them the recognition signals. Outpost after outpost was taken by surprise. The coastal defenses soon acquired more gaps than a hockey player's smile.

Why did Tajok betray his kith and kin?

According to Tajok, they *weren't* his kin.

His family had been members of a persecuted—and prosecuted—religious minority. His parents, his siblings, his cousins—all of his relatives had been tried for heresy and executed.

And now their oppressors had become the oppressed.

Tajok rejoiced.

He had no regrets.

But he *did* have an agenda. Vengeance was only part of it. He was a gerontologist who needed subjects for his longevity experiments.

The Ambulans were only too happy to oblige.

Tajok infected thousands of Dokharans with fatal maladies. He crippled thousands more. He monitored their resistance to disease and tried to enhance it. He measured their recuperative powers and tried to augment them. Most of his treatments failed. Most. But not all. A few of his victims recovered and—in some instances—Tajok's procedures had been the determining factor. He could be sure of that because he kept repeating the process with different subjects until he *was* sure.

The makeeva flourished.

Makeeva were large, carnivorous plants that tended to grow in arid soil from which nutrients were difficult to extract. The makeeva stunned its prey with thorns that were coated with a powerful cholinesterase inhibitor. The leaves of the plant then closed around its victim and excreted a corrosive acid that consumed the remains. Digesting a big animal could take years.

Dokharans disposed of their dead by surrendering them to the untender mercies of makeeva. The shimuda performing the ceremony didn't actually say, "Earth to earth, ashes to ashes, dust to dust," but the basic concept was the same. Dokharans believed that absorption by a makeeva began a process by

which the dead were reunited with the soil from which they sprang.

The Ambulans had a different point of view. In their opinion, plant food was the highest destiny to which degenerate Dokharans could aspire.

Pure pragmatism dictated where Tajok's research facility was located. His experiments were conducted in a six-story building immediately adjacent to a cemetery. The building was subsequently enlarged, eventually acquired another story and two wings. The cemetery, too, was considerably expanded. More than once. If Tajok's activities had been allowed to continue, the city of the dead would have soon rivaled the city of the living in size.

But they weren't allowed to continue.

Ambulan aggressiveness didn't cease with the conquest of Dokhara. Bodajiz was invaded soon afterward. The Zifrans, supposing that they would be next, formed an alliance with the Bodajizans, Dokharan partisans flocked to join the coalition, and the Ambulans were eventually defeated. Tajok had to flee.

He was captured by Zifran troops. They mistook him for a fugitive Ambulan—one of many who were put on trial and sentenced to ten years of hard labor in the shiroz mines.

He survived.

Somehow.

He shouldn't have. Ten years in that hell-hole should have made makeeva fodder of him. Seven hundred and fourteen prisoners of war had been sent to the mines. Six years later, none of them were still alive.

Correction.

Almost none.

Tajok served his full sentence, was released on the same day as Luhor—a Zifran thief whose third offense had been punished with three years in the mines. Tajok and Luhor had become friends, did not part company when they were set free.

They made their way to Izmir.

In addition to being a collaborator and a mass-murdering monster, Tajok was an embezzler who had diverted some of the funds allocated to finance his research. He'd used the money to buy shiroz crystals. The irony of that did not escape him. His shiroz hoard was stashed away in a depository on the island of Izmir.

But he couldn't withdraw it without verify-

ing his identity. He had to give his actual name.

The news that Tajok had resurfaced spread like a nervous thrill.

To no one's surprise, Tajok's health was very precarious. He could afford to live comfortably—even luxuriously—but he was too frail and too weak to enjoy it. He was only killing time while he waited for time to return the favor.

The *Herald* had run the story, but the story hadn't been broken by the *Herald*. Baldwin's personal involvement had been limited to proof-reading copy obtained from other news agencies. Now—three years and hundreds of deadlines later—Baldwin had forgotten most of the details.

Unlike the Dokharans.

Forgive and forget was not a Dokharan motto. The atrocities Tajok committed hadn't been forgotten by his countrymen—definitely not. As for forgiving him . . . The Dokharans were very forgiving. They were for giving him a death sentence, and they were furious with the Izmirites for granting him asylum. Diplomatic fireworks ensued.

The Izmirites? They had been neutral during the war, were determined to remain neutral now that the war was over. They had no extradition treaty with Dokhara, flatly refused to deport Tajok, listened to appeal after appeal with deaf ears. They were of the opinion that life itself had sentenced Tajok to death. The sensible thing to do was nothing. Let nature take its course.

4.

And it did.

Tajok's obituary appeared in the *Izmir Herald* three days after Escoli's. Unlike Escoli, Tajok's death was attributed to natural causes, and—unlike Escoli—he wouldn't be missed. Escoli's funeral had been well attended. The only mourner bidding farewell to Tajok would be Luhor, and even that was by no means definite. When Baldwin interviewed him, Luhor hadn't seemed grief-stricken so much as emotionally numb. Baldwin attributed that to three years in the shiroz mines. An ordeal like that would presumably make a stoic out of anyone.

Kroydhun Ankurda 12-16 was an unpretentious dwelling in an unpretentious neighborhood. Doorbells and knockers were unknown

on Bukkara. Visitors announced their arrival by whistling into the mouthpiece of a speaking tube. Bukkarans took pride in developing their own, distinctive whistles. Baldwin's consisted of the first seven notes of the theme from *The High and the Mighty*—another classic film that Baldwin admired.

The door was opened by the most nondescript Bukkaran Baldwin had ever encountered. He wasn't short or tall, slender or heavy, ugly or handsome, and his face was a neutral mask, as blank and expressionless as the image on an ancient coin. Was it possible to have a more undistinguished and forgettable appearance? Baldwin was doubtful. If asked to describe him, Baldwin could have done so only in terms of what he wasn't.

Baldwin introduced himself. In addition to looking like nothing much, Luhor had nothing much to say. "I've already made an official statement," he declared. "You can obtain a copy from the authorities. I have no desire to expand on it."

"You're assuming that I've come to ask you about Tajok." A headshake. "I haven't."

"No?"

"A colleague of mine—Escoli—was here seven days ago. She was accompanied by her rulf hulke: Tumanzu."

"That is correct. She was." A frown. "She's a reporter? She didn't identify herself as such."

"She wasn't on assignment. She was Tumanzu's self-appointed escort. She was accommodating a visiting cousin. Being courteous."

"Courteous?" Luhor spat the word. "It wasn't courteous of her to bring him here. Not at all. Tormenting someone who's on his deathbed . . . that's not my idea of courtesy."

Baldwin gave him a look that should have turned him to stone, but Luhor remained miraculously unMedusafied. "Escoli was one of the kindest, most compassionate people I have ever known. She was incapable of tormenting anybody."

"She was?"

"Damn right she was."

With the condescension of someone explaining the obvious to an imbecile, Luhor said: "'She was.' As opposed to 'she is.' You're referring to her in the past tense."

"With good reason," Baldwin snapped. "She was killed. Murdered."

"Too bad." Luhor sounded as if he didn't

think it really was. He was on diplomatic autopilot, muttering conventionalities without conviction, his voice as hollow as an echo. "Please accept my condolences. *And* my assurances. My yuriki had nothing to do with her death. I can assure you of that."

Baldwin blinked. Yuriki? He recognized it as a very old, obsolete term, but its exact meaning eluded him. He ransacked his memory. Master? Sovereign? No—more like "liege." A yuriki was a suzerain with henchmen—or a henchman—who swore fealty to him.

"Tajok was your yuriki?"

"We were in the mines together. That's where we met. The shiroz mines. Tajok befriended me. He took me under his wing, protected me, taught me how to . . ." A pause ". . . not how to stay alive so much as how to keep from dying. Without his patronage, I wouldn't have survived." Luhor's black eyes met Baldwin's. "So yes—I thought of him as my yuriki."

"Tumanzu thought of him as a sugami."

"A dishonorable opponent?" Contrary to Baldwin's expectations, Luhor seemed to be taking this suggestion seriously. "He might have felt that way, I suppose—especially if he was a soldier. Did he fight against the Ambulans?"

"Most adult Dokharans did, but Tumanzu would have been a child when war was declared. He wasn't old enough to bear arms in that conflict."

Luhor raised an admonitory finger. "Don't be deceived by appearances. Tumanzu was one of my yuriki's successes. He's considerably older than he looks."

"You're sure?"

"He wouldn't have been admitted to this house otherwise. Vindictive Dokharans aren't ordinarily welcome here."

"Then no Dokharans are welcome here." Baldwin huffed a laugh as devoid of amusement as a lemon of sweetness. "Dokharans who *aren't* vindictive toward Tajok would constitute a minority of one: Tajok himself and none other."

"Tumanzu claimed to be an exception. He contacted us, said that the life-extension treatments he'd received had been very beneficial and that he wanted to express his gratitude. My yuriki was intrigued. Of course he was. He expected no thanks and desired none, but he was eager to examine Tumanzu—to verify

that the aging process had actually been retarded."

"And it had."

A brusque nod of affirmation. "No question about it."

"And Tumanzu was grateful?"

"No."

"But didn't he say . . .?"

" . . . that he wanted to express his gratitude. That's what he said. And that's what he did. He expressed his gratitude. To the Zifrans. For punishing my yuriki. For subjecting him to ten years of brutal servitude that ruined his health and shortened his life." Luhor made a cup of his hand and then deliberately upended it. "The exact opposite of what he'd hoped to achieve. What he *did* achieve—but for Tumanzu, not for himself."

"That was all Tumanzu really wanted? To gloat? To exult over Tajok's undoing? To rub salt in an open wound?"

"A genuine hatred. I'll grant Tumanzu that much. His hostility emanated from him like heat from a radiator. Or cold from a block of ice. It was uncontrived and undiluted. You almost had to admire its purity."

Deliberately echoing the insincerity with which Luhor's commiserations had been offered, Baldwin recited: "Please accept my condolences on the loss of your . . ." He started to say "friend" but changed it in mid-sentence to: ". . . yuriki. I apologize for intruding on your sorrow."

"That's quite all right. Making funeral arrangements is an unpleasant task. An interruption isn't unwelcome." As though struck by an afterthought, he muttered: "I don't know if reporters will be permitted to attend the funeral. You'll have to ask the authorities." And—like a lecturer stressing a point of clarification—he specified: "The Dokharan authorities."

"Dokharan?"

"Yes. His body is being shipped home for burial. The same makeeva that absorbed his father awaits him. I haven't decided if I'll be present. I'd rather not, but perhaps I owe it to him. Yes—perhaps I do. Is one friendly face among the onlookers too much to ask?"

5.

Danzoni was the Odenga of the shokiku—a title roughly equivalent to Prefect of Police. It

wasn't exactly the same because Izmir had no civilian constabulary. The shokiku belonged to a branch of the military, were naval officers whose duties would have been performed by police officers elsewhere. On Izmir, martial law was never undeclared. The Izmirites were acquainted with no other kind of law.

Danzoni prided himself on his command of Terran Standard, seized every opportunity to speak it and did so with great gusto, but—like so many people striving to master a second language—he doubted himself, was never wholly confident that he was getting his meaning across. Was he hitting the target? Instead of attempting to improve his marksmanship, he resorted to scattergun tactics, firing barrages of synonyms, one of which would hopefully be a bullseye.

When Baldwin was admitted to his office, Danzoni offered him a chair and said, "Be seated, Mr. Baldwin. Please. Sit down. Make yourself comfortable."

"Thank you."

"By no means. Not at all. Think nothing of it." Danzoni took his own advice and relaxed into the plush of an overstuffed armchair. "What can I do for you, Mr. Baldwin? How can I be of service?"

"You are investigating the murder of Escoli."

Danzoni's cheerful expression vanished as though wiped from his face by a dustcloth. "A great shame. Her death, I mean—not our investigation. A tragedy. Very sad. Most unfortunate."

"I'm told she was killed by a kojuma dart."

Danzoni confirmed the truth of this with a dart-casting gesture. "She was. Yes. A poisoned dart. That is correct."

"Not the sort of weapon you'd expect an ordinary Bukkaran to carry."

"No. Certainly not. Throwing a kojuma dart is a specialized skill. Throwing it *accurately*, that is. With precision. On target. Lots of practice is required. *Lots* of practice. Years."

Baldwin nodded. "It is, in fact, the weapon of a professional assassin, isn't it?"

"Just so. Yes. Indeed it is. A professional. An expert."

Baldwin opened the folder he was carrying and extracted seven photographic prints. "You returned Escoli's camera to us. These were among the pictures that were stored in its memory. They were taken over a period of

three days as she and Tumanzu went from place to place."

"Sightseeing. That is the term, is it not? Taking in the sights?"

"Yes. 'Sightseeing' is the word, and these were some of the sights they saw." Baldwin spread them out on the surface of Danzoni's desk. He might have been a merchant inviting Danzoni to inspect his wares. "My colleague, David Collins, examined the images that the camera had captured and noticed that these seven have something in common."

"Usiga."

Baldwin queried him with upraked eyebrows. "I beg your pardon?"

Danzoni hadn't bothered to scrutinize the pix. "The same person appears in all seven. Usiga. That is his name. Always in the background. Part of the scenery. Inconspicuous. Unobtrusive. We see him leaning against a tree. Or peeling a karei. Or entering a restaurant. Or hailing a watertaxi. But we recognize him, do we not?" Danzoni made a tent of his fingers. "Usiga. He is a paid killer. A professional assassin. A murderer for hire."

"Do you have him in custody?"

"We do not. No. Sad to say. Sorry."

"Why not?"

"He escaped. He got away. He eluded us."

Danzoni searched his vocabulary, decided that his Terran Standard was inadequate, and lapsed into Menduli. "It was very well planned," he said. "He was gone—no longer on Izmir and no longer in our jurisdiction—before we understood that a crime had been committed." Realizing that this statement required clarification, he amplified: "A kojuma dart is very small, does not usually remain embedded in the flesh of its victim, can be easily overlooked in the confusion. The poison mimics a heart attack. Escoli must have thought she'd been bitten by an insect. She swatted at it. The dart was dislodged and fell to the ground. We didn't find it until much later. Usiga was long gone before we knew we were looking for him. Actually, we didn't know we were looking for *him* until Escoli's camera showed him to us. Prior to that, we only knew we were looking for someone like him. Even that wasn't immediately obvious. The onlookers assumed that Escoli was ill. We weren't summoned until a physician had examined her."

"You don't know where Usiga is now, of course."

Reverting to Terran Standard, Danzoni said: "But I do."

"You *do*?"

"I do. Yes. No doubt about it. Dokhara. He boarded a ship bound for Dokhara."

Baldwin wheezed a sigh. "And Izmir has no extradition treaty with Dokhara."

"Yes."

"I didn't think you did."

"We don't. What I meant to say was: Yes—we don't got no extradition treaty with Dokhara."

Baldwin got to his feet, gathered the photos on Danzoni's desktop with a swipe of his hand, saw that one of them remained and made another attempt to grasp it. Only then did he realize that it was underneath a layer of protective glass. It was a picture of a very pretty Bukkaran female with brown eyes and a charming smile. "A lovely lady," he said. "Your mate?"

"Yes. Chikitodu. 'Chiki' for short. We have been together for eleven years."

"Any kids?"

"Kids?"

"Kids. Children," said Baldwin, and—in an attempt to avert a possible misunderstanding—he added: "*Not* goats."

"I see. Children. Cubs. No. We don't got no kids. I regret to say that Chiki is impregnable. Her doctors have examined her and confirmed it. She is inconceivable. Completely unbearable."

"You have my sympathy," Baldwin assured him.

6.

Baldwin was seated at his desk, playing an invisible piano on the arm of his chair and contemplating the ceiling as though a message of cosmic import were scribbled across its surface. Intense scrutiny had detected none so far.

A fret was gnawing at his subconscious, teasing him, nagging him, pestering him, rubbing his reporter's intuition the wrong way . . . *Dokhara*, he was thinking. According to Danzoni, Usiga had fled to Dokhara. *Why?* Baldwin asked himself. *Why Dokhara?* To avoid capture? Yes—but Usiga didn't have to go all the way to Dokhara to do that. He'd have been immune to arrest anywhere outside Izmir's

territorial waters.

"Minerva?"

"Yes, Greg."

"Please establish a link with the Mazabashi Inn."

Minerva's screen momentarily herring-boned and then cleared to disclose the image of a smiling Bukkaran female. "Mazabashi Inn," she announced. "How may I help you?"

"You have a guest by the name of Tumanzu. Can you ring his room for me?"

"I'm sorry." To demonstrate that she really was, she stopped smiling. "I can't do that. Tumanzu is no longer staying here."

This was the response that Baldwin had expected, but he still felt a twinge of disappointment. "When did he leave?"

"On the afternoon of his cousin's funeral."

"Four days ago?"

A brief pause for mental arithmetic. "Yes—I believe that's correct."

"Did he give a forwarding address?"

"No—not precisely."

"How about imprecisely?"

"Our reservationist booked passage for him on a ship that was homeward bound."

"To *his* home? To Dokhara?"

"To Dokhara. Yes."

"Thank you. Ochaba tadoi zatuki." This was a ritual phrase that defied literal translation, but the sense of it was: "Your assistance is appreciated."

The screen blanked. Baldwin wished that his state of mind were equally blank, but no—conjectures were writhing in his brain like cats in a sack, forming a pattern that he couldn't ignore.

Why had Usiga gone to Dokhara?

Baldwin didn't know—not for certain—but he had a strong hunch.

He suspected that Usiga had gone to Dokhara because Escoli hadn't been his target.

According to Danzoni, a kojuma dart was a difficult weapon to master. Even experts had trouble throwing one accurately, and—in this instance—Usiga had missed. He'd aimed at Tumanzu, had hit Escoli instead. A regrettable mistake—not only because an innocent bystander had been killed but because the job Usiga had contracted to do remained undone. He couldn't remain on Izmir. The shokiku were disconcertingly efficient. He had to make his getaway while he still could. And so . . . ?

Dokhara. He went to Dokhara—a safe haven beyond the reach of the law *and* a hunter's lurk where the prey he was stalking would almost certainly return.

Four days. Tumanzu had embarked for Dokhara four days ago. The time-in-transit for a passenger vessel sailing from Izmir to Dokhara was usually six days. Tumanzu would be walking down a gangplank into a deadfall tomorrow or—at the very latest—the day after tomorrow.

Raising his voice to make himself heard across the office, Baldwin blurted: "Dave!"

Collins glanced up from the work he was doing. "Yes?"

"The diplomatic pouch . . . how often does it go?"

"How often does it go *where*?"

"From our local embassy to the embassy in Dokhara."

"Daily."

"Your mother's in charge of that, isn't she?"

Collins looked uncomfortable. "She is, yes, but using the diplomatic pouch to send a private message—if that's what you're suggesting—well, that's kind of like using the Holy Grail for a chamberpot. It just ain't done."

"Relax. That's *not* what I'm suggesting."

"Good."

"The courier goes by shuttle, doesn't he?"

"Yes."

"How about letting me tag along?"

Collins' expression was illegible. "That's what you have in mind?" He shook his head. "You've got to be out of it. Your mind, I mean."

"Maybe so, but I *must* be in Dokhara tomorrow."

"It's that important?"

"Yes."

"Why?"

"Because I owe it to Escoli."

Collins rose from his chair, crossed the room, and perched on the corner of Baldwin's desk, one haunch on the edge, one foot on the floor. He focused an interrogatory gaze on Baldwin and said: "Suppose you tell me what this is all about."

7.

No evidence.

That was the problem.

Baldwin had no real evidence.

What he'd told Luhor was the truth and nothing but. Escoli had been one of the kindest, most compassionate people Baldwin had ever known. Enemies? She'd had no enemies.

Who would have paid an assassin to kill her?

The very idea was ludicrous.

But it wasn't evidence—not unless lack of evidence could be counted as negative evidence of some kind.

Baldwin couldn't go to Danzoni with a chain of logic forged from links as weak as that. Similar objections prevented him from approaching officials of the Izmirite government or of the Terran embassy. No one was going to risk provoking an international incident because Baldwin—and only Baldwin—believed that Tumanzu was in danger.

Could he convince someone authorized to take action that taking action was necessary? Even if he could, they couldn't.

The initial Terran expedition to Bukkara had made a splashdown, not a landfall. First contact had been with the islanders of Izmir. Consequently, the largest of the Terran enclaves was on Izmir, the most influential Terran embassy was on Izmir, and Terran technology had infiltrated Izmirite society to a much greater degree than elsewhere. Danzoni had required no assistance to process the images from Escoli's pix-shooter, and he used handhelds to communicate with his shokiku, but he couldn't use them to communicate with the Dokharans because there were no relay satellites orbiting Bukkara. He couldn't contact them by radio either. The religious intolerance that had exterminated Tajok's family was equally intolerant of wireless com units. One attribute of Shizenu—the Mishoman equivalent of the devil—was his ability to make himself heard over vast distances. Any device that conferred similar powers on mere mortals was regarded as diabolical. Dokhara, Zifra, Boda-jiz—none of the countries where Mishoma was the dominant faith permitted radio transmitters or receivers. Even the Terrans were reduced to sending dispatches by courier.

The rules strictly and absolutely forbade the courier to take a sidekick along, but no rule prohibited the embassy from hiring a new courier. Collins requested assistance from his mother, she went to the ambassador with an appeal on Baldwin's behalf, the regular couri-

er learned—much to his surprise—that he was too ill to make the run, the alternate who would have ordinarily substituted for him was inexplicably incommunicado, the routine dispatches awaiting transport were reclassified “Urgent,” and—since high-priority documents of this nature couldn’t tolerate delay—the embassy was compelled to appoint an alternate to the alternate.

Bureaucracies can be—and usually are—appallingly inefficient, but efficient bureaucrats can—and usually do—find ways to circumvent the regulations.

Collins’ mother was an efficient bureaucrat.

The Terran Embassy in Kazunori, the capital of Dokhara, had a rooftop shuttle-pad. Baldwin was standing on it less than fourteen hours after he asked Collins for help.

Collins’ mother was a *very* efficient bureaucrat.

8.

The port of Izmir and the port of Kazunori were both hubs of bustling activity, but the Kazunorian waterfront was also an open-air marketplace. It had a festive, carnival atmosphere that blurred the distinction between work and play, profit and pleasure, business and busyness.

Ships were docking and undocking. Passengers were embarking and disembarking. Crews were coming and going. Vessels in need of overhaul were being winched out of the water and sailors in need of overhaul were being winched out of their pay.

All of that was to be expected. What Baldwin hadn’t expected was the motley jumble of kiosks and stalls cluttering the quays. Fresh fruit and vegetables were for sale. So were flowers, pottery, cooking utensils, jewels, tools, weapons, clothes, medicines, amulets, seeds, pets, intoxicants . . . and so on and so forth. Lack of entertainment was certainly no problem. Acrobats tumbled, dancers capered, poets recited, actors declaimed, storytellers lied, fanatics sermonized, charlatans swindled, singers vocalized, and jugglers played elaborate games of catch with themselves. Ballyhoo spielers made persistent entreaties to passers-by, adding sales pitches to an intermix of overlapping sounds that was already cacophonous.

It almost had to be the *Izanumi*. Only one other ship had departed Izmir for Dokhara on

the afternoon of Escoli’s funeral, and Tumanzu wouldn’t have had time to get aboard before it sailed. Inquires had revealed that the *Izanumi* was approaching the harbor. Baldwin was lingering on the pier like a ghost condemned to haunt it, watching as the *Izanumi* was gentled into its berth, waiting for the gangplank to be lowered, trying to keep an eye on the crowd *and* on the debarking passengers who were joining it.

And there he was.

Not Tumanzu.

Usiga.

With a shock of recognition, Baldwin realized that he was looking at a familiar face. He had seen it exactly seven times before. Usiga was manning a booth where customers were competing for prizes by casting darts at moving targets. Presumably, these darts weren’t poisoned, but the disguise Usiga had adopted wasn’t really much of a disguise. It was only one step removed from the truth. If Usiga had been one of the contestants, he could have won all the prizes with ease. Maybe he had. Maybe that was how he’d become the proprietor of this kiosk. He was sufficiently skillful to have put the previous owner out of business.

The ship was still disgorging passengers. Tumanzu had not as yet appeared, but Usiga was well positioned to strike when Tumanzu descended the companionway. Could Baldwin intervene before Usiga got his chance?

Baldwin made no attempt to force his way through the center of the crowd. Too many people. Too tightly compacted. The best he could do was insinuate himself through the periphery, advancing down the jetty in an awkward succession of detours, deviations, and evasions . . . Soup on a stovetop. That was the comparison that occurred to Baldwin. The squirm and jostle on the docks reminded him of a boiling cauldron.

He was simultaneously consumed by a frantic sense of urgency and by a cold drench of doubt.

What if he didn’t reach Usiga in time?

What if he *did*?

Usiga was a trained killer. Baldwin wasn’t. Baldwin was a middle-aged journalist. His only weapons were words . . . Was the pen really mightier than the sword? Baldwin was dubious. No one who had tried to parry a scimitar with a stylus was available for comment. The

honored dead rarely were.

Even as Baldwin struggled so desperately to get to Usiga, his hindbrain was spinning, trying to decide what to do when he got there. Baldwin had no illusions about himself. He was no storybook hero. If he were foolish enough to challenge Usiga, he'd be swatted like a bothersome insect. No—a physical confrontation with Usiga was out of the question. What other options did he have?

Words, he thought.

If my only weapons are words, maybe I should make use of them.

"Stop!" he shouted. "Thief!" He pointed nowhere, anywhere, everywhere—a nonspecific gesture of accusation aimed at nobody in particular. "There! Don't let him get away! Stop that thief!"

Sensation.

Confusion.

Milling vortexes of commotion formed within the crowd as attempts were made to apprehend the culprits. Three of them. As Baldwin had guessed, more than one pick-pocket had been working the docks. Now they panicked and made frantic attempts to escape. They filtered through the crush like wisps of steam, dodging and weaving and eluding outstretched hands.

Baldwin selected a Dokharan at random—a ventriloquist who had been entertaining a knot of cubs on the sidelines—grasped his unencumbered wrist, and bellowed: "Here! I've got him! Help!"

His victim took a quick step toward Baldwin, elbow bent. He freed himself from Baldwin's grip with a sudden jerk of his arm, staggered back, and drew a knife, but the people who had responded to Baldwin's call closed in on him like an incoming tide. His arms were pinned to his sides. Other hands lifted him off his feet. He struggled futilely in their grasp, snarling and cursing fluently.

Baldwin stood perfectly still, allowing the center of the conflict to flow past him, then began edging toward Usiga's booth. The congestion hadn't been dispersed by the disturbance, but it had been redistributed, creating regions of lesser density and even one or two circles of open space. Baldwin squeezed through the press, shoving and elbowing, pushing and nudging, apologizing for his rude behavior without desisting from it, moving

from one impact to the next like a pinball colliding with a succession of bumpers. Out of the corner of his eye, he saw Tumanzu emerge from the innards of the *Izanumi* and start down the gangway. Usiga extracted a dart from the hundreds of misses that were embedded in the backdrop behind the targets. *A good hiding place*, Baldwin acknowledged. *Very clever*. Not a needle concealed in a haystack but a needle concealed in a jumble of needles.

With a last gasp of effort, Baldwin bulldozed through the skirmish of bystanders that still separated him from Usiga. He assumed a position that blocked Usiga's view and spoiled Usiga's aim. Usiga gave him a glare of undiluted hostility. *Words*, Baldwin reminded himself. *Words are your weapons*. He leaned closer and raised his voice to make himself heard above the bedlam on the pier. "Tajok!" he yelled.

Usiga's eyes narrowed. His face curdled to a scowl.

"Tajok is dead!" Baldwin made a sweeping gesture of cancellation. "You have no employer! Your contract is no longer valid!"

Baldwin had been uncomfortable in the role of a hero rushing to the rescue. He was much more convincing as a newsman delivering the news. All he had to do was be himself. He fiddled with the controls of his comtote and offered it for Usiga's inspection. The screen displayed Tajok's obituary from the *Izmir Herald*. "See? It's true. You have no obligation to Tajok."

Usiga's only response was a curt nod. He turned, grasped the curtain at the back of the kiosk, twitched it aside, stepped through it, and was simply gone. Had he jumped into the water? Had he slid down a rope into a waiting boat? Baldwin would never know, but he had to concede that it was a remarkably effective disappearing act. Again, Usiga's escape had been well planned.

9.

"Let me see it."

Baldwin and Tumanzu were seated opposite each other on the cushioned seats of a hozen—a water-taxi. The hozensu operating this trim little craft was its driver in both senses of the word: he not only steered it but also supplied its motive power. He was pedaling hard. The sternwheel was churning, pursuing itself in a delirium of neverending redundancy. They

were making slow but steady progress, hugging the shoreline as they made their way around the curve of Kazunari Bay. The water slid past with a slither of sibilant mirth. The quivering phosphorescence of their wake diverged and spread behind them like a comet's mane.

As he had done on the wharf, Baldwin activated his comtote manually. He didn't want to call attention to Minerva by addressing her directly. The Dokharan authorities almost certainly knew that the "com" in "comtote" stood for "communications" as well as "computer," but they pretended otherwise. Here, in Dokhara, comtotes couldn't be used to make long-distance calls or—for that matter—short-distance calls. No telstars. No relay towers. No receiver dishes. That being so, the devices were grudgingly tolerated, but openly talking to Minerva would be pushing his luck. That could very well get Minerva confiscated.

Usiga had merely scanned the headline. Tumanzu wasn't satisfied with that. He read the entire article, giving it his undivided attention, studying each sentence so intently that he might have been trying to commit the text to memory.

"Bowajiru!" Tumanzu didn't speak the word so much as spit it. Coming from him—ordinarily so polite and restrained—the obscenity was shocking. He aimed a .45 caliber forefinger at the screen. "Is *that* correct?"

"Is what correct?"

"Tajok is to be makeevasukku?" Realizing that Baldwin might not be familiar with the term, Tumanzu backtracked and rephrased. "It says here that Tajok's body is being returned to Dokhara. It says he's scheduled for absorption by a makeeva."

Baldwin shrugged. "I assume it's true. Luhor released an official statement saying so. He made mention of it to me, too."

"To you?"

"Yes. I interviewed him. He wasn't sure if he'd be attending Tajok's funeral."

Tumanzu's eyes grew reflective. "He probably didn't anticipate the opportunity to do so."

"Why not?"

Tumanzu's hands spread wide in an isn't-it-obvious? gesture. "Luhor didn't emerge from the shiroz mines in a robust state of health. Of course not. Nobody does. He couldn't have expected Tajok to predecease him. The reverse must have seemed more likely. If I were

him, I'd have bet on it."

Baldwin snorted a laugh. "That's a sucker bet if there ever was one. If he won, how could he collect?"

Tumanzu grudged him a faint smile, but it was a mirthless quirk of his lips. He wasn't sincerely amused. "I've been told," he said, "that Terrans consider our obsequies gruesome."

"Some do."

"And you? How do you feel about it?"

Baldwin made a sour-taste mouth. "Consigning the dead to flesh-eating plants . . . well, I can't deny that I find the concept a little creepy."

"More so than burial?"

"Maybe it's just a question of the rites to which we're accustomed, but yes—burial seems more dignified to me. More compatible with an eternal resting place."

"Don't kid yourself. An eternal resting place?" Tumanzu gave an emphatic headshake. "There is no rest for the dead," he asserted. "They aren't at peace. No. I assure you—the dead are kept very busy. They're swarming with parasites. Worms slither between their lips and down their gullets. Larvae breed and squirm in their bellies. The bacteria that abetted digestion while they were alive are now engaged in digesting *them*. They twitch. They writhe. They are defiled by vermin, reduced to decay and corruption. Only when their bones have been picked clean are they permitted to rest."

Baldwin's face underwent strange convulsions, as if he were swallowing medicine that left a bitter aftertaste. "I take some consolation from that thought that Escoli isn't really there. She vacated the premises before demolition began."

"The point I'm trying to make," Tumanzu insisted, "is that *your* funeral ceremonies—and those of the Izmirites—seem disgusting to *us*."

"The eye of the beholder," Baldwin muttered.

"I beg your pardon?"

"It's an old Terran aphorism," Baldwin explained. "'Beauty is in the eye of the beholder.' The reverse, I suppose, is equally true. Ugliness, too, is subjective."

"Just so. To a Dokharan, the makeevana tradition is solemn and venerable. This is how we say farewell. This is how we cope with bereavement. When our time comes, this is how

we achieve unity with our homeland. We rejoin the ancestors from whom we came and we go forth to the eternity that awaits us. It isn't just a custom. It isn't just a formality. It is a final act of consummation. It completes us. It makes us whole."

A final act of consummation, or a final act of consumption? Gobble. Gulp. Gone. Burp. Excuse me.

This was the irreverent thought that, unbidden, went capering through Baldwin's mind. Baldwin made a determined effort to maintain a sober expression. The imps of the perverse were attempting to commandeer his consciousness. He must stand ready to repel boarders.

So this is how it ends—not with a bang but a belch.

That was no better. Baldwin suppressed an urge to grin.

Tumanzu was staring at him earnestly. "Do you understand?"

"The idea is a little hard to . . ." Swallow? Baldwin resisted the temptation to say that and substituted: ". . . accept, but yes—I'm beginning to get a handle on it."

Tumanzu's face was clenched like a fist. "Then perhaps you can appreciate what an abomination this is! A traitor to his country cannot be makeevasukku! You don't confer honors on a mass-murderer who has no honor. Tajok cannot be accorded the same respect due to people who deserve it."

Baldwin could think of no reply to this and made none. Opting for a change of subject, he said: "Your hatred for Tajok seems to have been reciprocated. His immediate reaction to your visit was to hire an assassin."

"Our reunion," Tumanzu drawled, "wasn't exactly congenial."

"It wasn't meant to be, was it? After all, you went there to taunt him."

"I did. Yes."

"Congratulations. Mission accomplished. You must have infuriated him."

Tumanzu was dubious. "If so, he gave no outward sign of it. Not that I expected one. You'd be more likely to get an emotional response from a stone statue. Tajok rarely changed expression. He sent thousands of his 'experimental subjects' to their deaths without blinking an eye."

"Terrans would describe that as 'a poker

face.'" Baldwin mimed shuffling and dealing cards. "We play a game," he explained, "that can sometimes be won by convincing your opponents that you're holding better cards than you really have. Controlling your facial features is part of the strategy. You want to remain as inscrutable as possible."

"Tajok wasn't exactly known for playing games," Tumanzu retorted, "but if you could have coaxed him into playing that one, he'd have been good at it. High stakes wouldn't have bothered him. He was accustomed to gambling with Dokharan lives."

"And he didn't mind losing."

"No. He most certainly didn't." Tumanzu's eyes had become narrow slits. They weren't focused elsewhere so much as elsewhere, contemplating horrors from his past that only he could see. "Come to think of it," he said, "the stakes probably *weren't* all that high—not if you measure them by the value Tajok himself placed on them. The loss of other people's lives was a misfortune he bore with equanimity."

The hozen had almost completed the circuit of the bay and was approaching the dock. Baldwin made an all-inclusive gesture that embraced all of creation. "What next?" he inquired.

"I told you. My house has a guest room. You're welcome to use it. Stay as long as you like."

"I appreciate the invitation, but that's not what I meant. Tajok is dead. Usiga's contract is void. You're no longer in flight mode. So what's next? You can do as you please. What will that be?"

Tumanzu returned Minerva to Baldwin. "I'd have given you a different answer before you showed me that. Now that I've read it, my most urgent priority is to prevent that bowajir from polluting the soil of my homeland. Tajok betrayed Dokhara. Loyal Dokharans haven't forgotten. I assure you: we have not. We never will."

Again, Baldwin refrained from expressing the thought uppermost in his mind:

These Dokharans could have taught Captain Ahab a thing or two about holding a grudge.

10.

Tumanzu had said that his house had a guest room, and it did.

More than one.

Escoli hadn't introduced Tumanzu as her "rich" cousin, but if she had, she wouldn't have been exaggerating. One look at Tumanzu's home convinced Baldwin of that. It was a palatial, two-story structure perched on the edge of a precipice—a sheer drop that fell like a false promise to the breakwater a hundred meters below. Land's end. There—at the foot of the cliff—sea confronted shore, their ancient quarrel unresolved. The surf boiled and foamed, shattering on the rocks in explosive gushes of white spray.

The house itself looked like it had been constructed by the same firm that did Stonehenge. The walls were of heavy stones, thick and almost as solid as the promontory on which they rested. An array of all-seeing windows insisted that Baldwin admire and appreciate the vista. The panes had been polished to a state of transparent invisibility. They admitted bright boasts of sunlight that banished the shadows and conferred cheerfulness on a dwelling that would have been otherwise dour and fortresslike.

The centerpiece of Tumanzu's garden was an elaborate water sculpture. The nozzles rotated at random, never repeating themselves, each pattern unique, without precedent or duplicate—a display celebrating the haphazard and unpremeditated, perpetually reminding onlookers that the only universal constant was change.

Adopting such a luxurious lifestyle was tempting. Adapting to it should have been easy. But it wasn't. The metamorphosis from dedicated journalist to sybaritic parasite couldn't be accomplished overnight. Baldwin doubted that he would be Tumanzu's pampered guest long enough to become thoroughly corrupted.

He had nothing to detain him. His primary objective had been achieved. Usiga had abandoned the chase. Tumanzu's life was no longer in jeopardy.

That being so, Baldwin would actually rather go than stay. He wanted to get back to work and couldn't—not as long as he remained incommunicado.

That, he had to admit, was making him uncomfortable. Terrans were never out of touch. They had handhelds, comtotes, uttermosts, powwow pods, and so on. Some of them even

had surgical implants—com units that were essentially extensions of their brains. Baldwin had never before realized how acclimated he was to a society in which he could contact anyone he knew almost instantaneously. The inability to do so was an unscratchable itch—a constant abrasion disrupting his peace of mind. Only one consideration kept him from bidding Tumanzu farewell and boarding the next ship that was Izmir-bound. Curiosity. Baldwin had more than his share of it. That was why he'd become a journalist in the first place, and that was why he'd decided to delay his departure. His reporter's curiosity had been aroused.

Tumanzu had gone to considerable trouble to shame and belittle his sugami while Tajok was still alive, but that—apparently—wasn't enough for Tumanzu. His lust for vengeance hadn't died with Tajok. Now Tumanzu was seeking revenge on Tajok's lifeless body.

Would he succeed?

That remained to be seen, and Baldwin would remain long enough to see it.

11.

Tumanzu went to the Genjuko—the council of magistrates—and filed a formal protest.

He was told to get in line.

Tumanzu was merely adding one more voice to an outcry that was already echoing throughout the halls of government.

Tajok had made his own funeral arrangements. Fifty-six days ago, the keepers of the cemetery—the mizuni—had received written instructions and payment in advance from Tajok himself. Ordinarily, such a request was routine, but—for obvious reasons—this request was considered neither ordinary nor routine. Tajok's name was a curse in Dokharan mouths. It had become a synonym for "atrocities." The mizuni didn't want the mortal remains of such a monster polluting their graveyard, but they had no right to reject an applicant just because he'd been an evildoer—not even an evildoer of epic stature. They had petitioned the Genjuko for permission to refuse.

The legalities involved had nothing to do with Tajok's ethical behavior. Or lack of it. The makeeva awaiting Tajok was planted in soil that belonged to Tajok. It was one of four plots that Tajok's great-grandfather had purchased—a quadruple gravesite that had been

owned by the family ever since. Technically, it was Tajok's personal property. He could do with it as he pleased.

No one on either side of this argument favored accommodating Tajok, but revoking title to a parcel of real estate just because the owner was unpopular . . . *that* wasn't a precedent anybody advocated. The debate continued to rage.

But quietly. Behind closed doors. Every effort had been made to keep the dispute under wraps—successfully, so far. The general public was not as yet aware of it.

Meanwhile, the *Izanumi's* sister ship—the *Izanugi*—was expected soon. Tajok's corpse was presumably on board. If the issue couldn't be resolved prior to the *Izanugi's* arrival, a storm of controversy was sure to break.

As it happened, the storm broke sooner than that.

On the afternoon of Baldwin's third day in Kazunori, Tumanzu returned home, handed Baldwin a bulky sheaf of papers, and exclaimed: "What do you make of that?"

Baldwin examined the bundle with interest that was not feigned. He knew what it was but had never before seen one. For the first time in his life, the professional newspaperman was holding an actual newspaper.

The Bukkaran counterpart of the *New York Times* bore scant resemblance to it. The *Hoyabusa* or *News of the Day* was formatted more like a tabloid than a broadsheet, the texture of the pages was closer to cloth than paper, and the ink had been transferred from wooden stencils that didn't make as clear an impression as metallic type. In addition, the text was read back-to-front and was set in alternating lines that went top-to-bottom, then the reverse, and so on. None of this bothered Baldwin. He was accustomed to it. The *Izmir Herald* was broadcast in Terran Standard, Menduli, and several other Bukkaran dialects, but the *Herald* did have headlines, and the *Hoyabusa* didn't. Lack of them was, to Baldwin's eye, a conspicuous shortcoming.

Baldwin didn't need a headline to identify the article that had ruffled Tumanzu's fur. Tumanzu had drawn a big, black circle around it. "An Offended Patriot"—otherwise anonymous—had submitted an editorial expressing outrage at Tajok's homecoming. The facts were succinctly and accurately summarized.

Tajok's betrayal of Dokhara and his subsequent crimes against Dokharans were recapitulated. The writer stated—correctly—that Izmirite stubbornness was all that had kept Tajok from being tried for treason and executed. "If Tajok had returned to Dokhara alive, he would have remained alive only long enough for a verdict to be reached. The issue of makeevasukku wouldn't have been raised. Disposal of his body would have been left to the garbage collectors. And rightly so. Why should he be treated any differently just because he happens to be dead? If his life had been praiseworthy, we would continue to commend him for it. Why shouldn't we continue to condemn him for a life of ignominy?"

Baldwin gave Tumanzu a glance of inquiry. "You have much in common with the Offended Patriot," he observed. "Did you, by any chance, write this?"

Tumanzu responded with a throwaway gesture of denial. "I did not," he said. "But I could have. You showed me Tajok's obituary. I've known the exact date of his death ever since. The editorial makes mention of it. See? Third column, middle of the page."

"Yes. So it does."

"Thanks to you, that tidbit of information had been revealed to me." He pointed to himself and then to Baldwin. "Me and you. I could have written it. And so could you. And no one else. We are the only two people in Dokhara who knew that."

"Evidently not."

"Do the math. The *Izanumi* sailed before Tajok died. The *Izanugi* is making the crossing now. None of the other ships currently in port stopped at Izmir. I'm sure. I checked." A dramatic pause while Tumanzu waited for Baldwin to connect the dots. When Baldwin failed to do so, Tumanzu did it for him. "The author of that editorial knew when Tajok was going to die. He knew *in advance*. Do you see?"

Baldwin squinted in concentration. "The editors of the *Hoyabusa*," he said. "Let's get in touch with them. Maybe they can tell us who the Offended Patriot really is."

"They can't. I already inquired. What they *can* tell us is that the Offended Patriot not only knew in advance but knew a long time in advance. The text of this editorial was delivered to them by courier fifty-nine days ago. It came in a sealed envelope with instructions

specifying that it was to remain sealed for fifty seven days. They opened it on schedule. They spent a day fact-checking.”

“And they published it today.”

“Yes—almost as if they were puppets whose strings are being pulled by the Offended Patriot.”

12.

When the *Izanugi* docked, the ship was greeted by an angry mob.

The potential for civil unrest had been foreseen—no oracle had been needed to make *that* prediction—and the riot squad had been dispatched to keep the peace. That was what their name meant—“awoji” equaled “peace-keepers”—but nobody called them that. The slang expression for them was “nugakude”—an impolite term difficult to translate, but “ass-kickers” wouldn’t be far from the mark. Rebels confronted by the nugakude had a simple choice. They could depart in peace or depart in pieces.

Interment of the dead wasn’t a Dokharan tradition, but Dokharans knew what a coffin was. Tajok’s body had been put in a coffin for transport, and when Tajok’s coffin was offloaded, a spiteful susurrous like escaping steam rose from the crowd. If all of the protestors assembled on the waterfront had been miraculously transformed into hissing serpents, they would have made a noise like that. It was hatred made audible, and Baldwin shuddered at the sound of it.

Luhor had disembarked with the other passengers. No one had accosted him or attempted to molest him. That was because no one except Baldwin knew who he was. Tumanzu could have identified him, but Tumanzu hadn’t met the ship. He had been summoned to give testimony before a special session of the Genjuko. Luhor strolled down the quay, calm and unhurried, flanked on both sides by demonstrators who would have torn him limb from limb if the purpose of his visit had been revealed to them.

Baldwin and Tumanzu had been breakfasting when Baldwin announced his intention to join the throng that was gathering on the wharf. “The *Izanugi* will get a lively reception,” he said. “I’d like to see that for myself.”

Tumanzu swallowed a mouthful of toasted akicki and wagged an admonitory finger at

Baldwin. “I’ll expect a full report.” He sounded like a schoolteacher assigning homework. “That’s what you do, isn’t it? Reporting? How about doing a little of it for me?”

Baldwin was willing to accommodate him. He used Minerva to make a photographic record of the day’s events. The comtote’s built-in camera couldn’t compete with Escoli’s pix-shooter for high contrast, sharply defined images, but that degree of professionalism wasn’t required for this task. The shots he got of the ship, the crowd, the nugakude, Luhor, and the coffin would be more than adequate to give Tumanzu a thorough briefing.

Foreigners entering Dokhara didn’t have to go through customs—to the best of Baldwin’s knowledge, customs inspections weren’t a Bukkaran custom—but there were still formalities to be observed. Luhor had to take charge of Tajok’s coffin. Arrangements to have it transported to the cemetery needed to be made.

When Luhor had attended to these details, he emerged from the offices of the shipping firm and found Baldwin waiting for him. Luhor’s face remained emotionless, but his tone of voice betrayed surprise. “Mr. Baldwin! I didn’t realize that you and I were fellow travelers. You should have sought me out aboard ship. We could have become better acquainted.”

Luhor’s assumption that Baldwin had made the crossing on the *Izanugi* was incorrect but understandable. How else could Baldwin have gotten here? Luhor’s presumption that Baldwin wanted to become better acquainted was equally incorrect and less understandable. Their previous encounter hadn’t exactly been cordial. Why would Baldwin want to become better acquainted?

“I see you decided to come,” said Baldwin, stating the blatantly self-evident as though he were a soothsayer dispensing wisdom.

Luhor was unprepared for the abrupt change of subject. He blinked. “I beg your pardon?”

“To Tajok’s funeral. You weren’t sure you’d come. I see that you have.”

Shifting mental gears, Luhor replied: “Yes. I realized that trouble was brewing. It seemed to me that . . . well, that I owed it to my yuriki. He made his wishes very clear, but he can no longer speak for himself. I must speak for him, make sure that the obstructionists do not prevail.”

“That might be easier said than done.” Baldwin gestured, indicating the harbor and the

swarm of irate protestors congregated there. "It's not only them and others like them. The Genjuko has been convened to consider this issue."

Luhor gave the office he'd just left a backward glance. "So I've been informed. It seems that my yuriki's coffin must remain here—in cold storage—until the Genjuko renders a verdict."

"The delay could be prolonged. Tumanzu tells me that the debates before the Genjuko have been heated."

"Tumanzu?"

"Yes. That's where he is now. He, too, is testifying."

Luhor's scowl could have soured milk. "No need to ask what recommendation he'll make. Is there?"

"He's only one of thousands of like-minded Dokharans. The preponderance of public opinion is not in doubt. It never was. But the popular choice may not be lawful."

"So the decision hangs on a legal technicality?"

"That is my understanding. Yes."

Luhor bristled his hands together. "Then I'd better hire myself a jikyu, hadn't I?"

13.

A Dokharan jikyu wasn't an attorney so much as a counselor. He didn't plead cases in court or before panels of magistrates. His clients were required to do that for themselves. His primary responsibility was teaching them how to do it. He gave them legal advice, helped them to strategize, coached them, guided them, told them what to say and what not to say, drafted documents and submitted them to the proper authorities, and attended to all of the opening gambits, preliminaries, and overtures that preceded the performances he was training his clients to deliver.

Nishizuki had a well-deserved reputation as a sly, serpent-tongued jikyu who could convince even the most stubborn skeptics that up was down, in was out, black was white, and night was day. What's more, his powers of persuasion were contagious. He could take an ordinary, comparatively inarticulate Dokharan and convert him into a compelling debator whose judges would not only rule in his favor but apologize to him for having the temerity to sit in judgment on him.

If anybody could devise a winning ploy for Luhor, it was Nishizuki, but his first act as

Luhor's jikyu was to concede that he hadn't done so—at least not yet. He applied for and was granted an extension to confer with his client and consider his options. The Genjuko continued to conduct hearings, but they were mere formalities. Everyone understood that a final decision had been deferred until Luhor was ready to address the council.

Meanwhile . . .

Luhor had vanished. Three days had passed. He had made no public appearances, issued no public statements, did not seem to be lodged at any of the various establishments that were open to the public. He was registered at none of the hotels, inns, or rooming houses scattered throughout the city.

"That proves nothing, of course," Tumanzu grouched. "He could be using an alias." He shook his head, disagreeing with his own assessment. "I doubt it, though. I think Nishizuki's taken him to some hideaway and is desperately trying to bestow the gift of eloquence on him. I don't envy Nishizuki *that* task! Luhor's croak is by no means the voice of an orator."

Baldwin registered mild surprise. "His croak?"

"The shiroz mines will do that to you. If you'd spent three years breathing dust and coughing up your lungs, you, too, might speak with a rasp."

"But he doesn't." Baldwin's forefingers were pointing in opposite directions—a gesture signifying *on the contrary*. "I've had two conversations with him. He doesn't sound hoarse to me."

Raising his voice, Tumanzu bellowed: "Something wrong with your hearing?" He and Baldwin were seated in the same room at the same table, but—judging by sheer volume—he might have been addressing someone in another time zone.

Baldwin flinched. He snarled: "I'm sitting next to an ogaku saruja who may have just shattered my eardrums!" He was genuinely annoyed, wasn't bothering to pretend otherwise. The expression "okaku saruja" wasn't ordinarily used in polite society. It wasn't ordinarily used in impolite society either—not unless the person using it was looking for a fight. "Apart from that, no—there's nothing wrong with my hearing."

Tumanzu's smile faded from his face like mist

from a mirror. "The words coming out of Luhor's mouth sound like they've been through a grinder. How could you fail to notice?"

Baldwin—still vexed—snapped: "I failed to notice because there was nothing to be noticed. Luhor's voice isn't especially sonorous, but it isn't gruff either." He activated Minerva and meddled with her buttons. A voice emerged from the comtote's speakers: "Mr. Baldwin! I didn't realize that you and I were fellow travelers. You should have sought me out aboard ship. We could have become better acquainted." Baldwin patted Minerva's slick carapace. "See?"

Tumanzu was wearing an expression of dropped shock. "No—I *don't* see. But I hear—loud and clear. I just don't believe what I'm hearing."

With the air of a fisherman dangling bait in the water, Baldwin teased: "Would you *like* to see?"

Tumanzu's eyes widened. "Pictures? You have pictures of Luhor?"

"Of course I do. You gave me explicit instructions. Remember? A full report. You expected a full report from me."

"A *verbal* report. I wasn't thinking in terms of photographs." Tumanzu wagged a forefinger in a come-hither gesture. "Here. Let me see."

A quick review of the material stored in Minerva's memory revealed three images of Luhor. None were close-ups, but his features were clearly visible in the third. Baldwin enlarged it, and handed the comtote to Tumanzu. He took one look and barked an expletive that made "ogaku sauja" seem mild and inoffensive by comparison. He didn't rise to his feet so much as bounce out of his chair, was halfway across the room and headed for the front door before Baldwin could gather his wits. "Come on!"

"Where are we going?"

"I'll tell you on the way."

Tumanzu wrenched the door open and emerged from it like a cuckoo from a clock. He took four more steps, suddenly halted, slumped bonelessly to the ground, twitched, and went slack.

The kojuma dart was embedded in the hollow of his throat.

Baldwin got a fleeting glimpse of Usiga as he did a backflip off the guardrail on the seaward side of the terrace. Baldwin had no

chance to interfere, was not tempted to try.

14.

"Your willingness to grant me an audience is sincerely appreciated. If I were a Dokharan citizen, I'd be entitled to a hearing—it would be one of my birthrights—but I'm not and it isn't. I am a Zifran who subsequently became an Izmirite. As such, I have no legal status in this chamber. You could have rejected my request. But you didn't. You have extended remarkable courtesy and indulgence to a stranger. Permit me to express my gratitude."

A very pretty little speech, Baldwin was thinking. *Well rehearsed and flawlessly recited. Smooth delivery. No trace of a rasp or boarseness.*

The hall where the Genjuko met seemed more like a temple than a council chamber. It seemed that way because that's what it was. It did double-duty as a place of worship and as a seat of government. Directly behind the podium where the genjuki sat was a massive altar. When the Genjuko was not in session, religious rites were conducted here. Baldwin would have been willing to bet that the law-makers of the council and the priests of the temple were one and the same. He frowned. *One and the same? Make that twenty-two and the same.* At the moment, all twenty-two of them were wearing stern expressions and listening to Luhor with unwavering attention. Their eyes were grave, and Baldwin suspected that no glance of compassion or look of pity had ever issued from them.

If Baldwin had been the object of their scrutiny, he would have been intimidated, but Luhor's composure remained unruffled. He said: "As Tajok's sole heir, I have an obligation to him. The solemnities marking his passing have become my responsibility. Tajok specified what he wanted done. What will *be* done is for you to decide."

Luhor's statement suggested that he was a supplicant thankful for any crumbs of consideration that the genjuki could spare, but he didn't really mean it and he wasn't a good enough actor to convince anyone that he did. These were polite insincerities that Nishizuki had put in his mouth. Luhor was obediently regurgitating them, but he spoke his lines without animation or conviction. His face was expressionless. His voice had the lifelessness

of a mechanical recording.

Nishizuki must have warned his client that he would be addressing a unreceptive audience, unlikely to be swayed by honeyed words. Luhor wasted no more time of deferential preliminaries. Getting directly to the point, he said: "Tajok is hated by many—if not all—of his fellow Dokharans. I knew that, and I was prepared for it. I was *not* prepared for the intensity with which he is hated. The antagonism toward him should have died with him—or so I would have supposed—but no: his enemies are determined to deny him makeevasukku, his friends—with one exception—are nonexistent, and the issue wouldn't be in much doubt if you Dokharans weren't such law-abiding people. But you *are*. As such, you find yourselves constrained by an awkward point of law. Tajok was the legitimate owner of the makeeva reserved for him and of the ground in which it is planted. His right to makeevasukku and his property rights are inextricably intermixed."

Luhor steeped his hands, making a bridge over nothing. "Tajok had no offspring. He was the only surviving member of his family. Now he, too, is gone, and I have inherited all of his worldly goods. His property has become my property."

Luhor paused, allowing the implications of that to register. "Permit me to propose a compromise," he said. "With your permission, I will instruct the mizuni to uproot the makeeva with which Tajok intended to merge, prepare it for transport, and arrange to have it shipped to Izmir. I will accompany it, and I will take Tajok's mortal remains with me. The house that I shared with Tajok on Izmir has a garden. The makeeva will be transplanted there, Tajok's body will be consigned to it, and he will be united with soil that was, after all, more hospitable to him than the soil of his homeland."

Luhor scanned the faces of the genjuki, attempting to gauge their reactions, but their features remained unreadable. "This—I think—would be acceptable to Tajok himself and inoffensive to his detractors." He bowed with disingenuous obsequiousness. "Thank you for your attention. I await your judgment."

The senior genjuki bestirred himself. "Your suggestion seems very reasonable," he said, "and if you had made it yesterday, I suspect it

would have been adopted—probably unanimously. But that was yesterday. Today we have received information that invalidates your argument and compels us to redefine our reason for being here. This was to have been a hearing to determine if makeevasukku would be extended to a war criminal. What it has become is a war criminal's last attempt to exploit the people he betrayed and victimized." He made an abrupt beckoning gesture. Five guards with drawn weapons converged on the witness box. "You are under arrest on a charge of high treason. Other charges will, of course, be forthcoming, but that one will do for the time being." He waved a hand in dismissal. "Take him away," he commanded.

And they did.

15.

"I wish I could say I suspected it all along." Baldwin's shoulders slumped, implying disclaimer. "I suppose I could *say* it," he amended, "but it wouldn't be true. I didn't have an inkling until Usiga killed Tumanzu. *That* got my attention—not only because murder had been done right before my eyes but because it made no sense!" Baldwin emphasized the senselessness of it by smacking his fist into his own palm and wincing at the pain he had senselessly inflicted on himself. "Six days. Only six days had passed since I'd proved to Usiga that his contract was void. What could have happened in the meantime? What could have changed his mind?"

David Collins was seated in the same chair that Tumanzu had occupied on the night when Tumanzu and Baldwin first met. Collins was drumming on the armrest with fidgety fingers. "Usiga is a professional," Collins observed. "If there's no profit in it, he doesn't do it."

"Exactly," Baldwin concurred.

Collins raised his eyebrows in conjecture. "His contract must have been renewed."

"Yes—but who would have a motive for doing that? I asked myself that question and only one candidate occurred to me."

"And that's when you realized the truth?"

"That's when my suspicions were aroused." Baldwin interlocked his fingers, using them like building blocks to erect a more complicated structure. "That's when I started putting the pieces of the puzzle together. I *had* most of the pieces in my possession. If I'd only at-

tempted to assemble them sooner . . .” His manner was that of a penitent seeking absolution. “But I didn’t. I made no effort to solve the puzzle until I recognized that a puzzle existed to be solved.”

“And when you did . . .?”

Baldwin’s head rotated like a weathervane seeking the proper orientation. “The war. The Dokharan/Ambulan conflict of twenty years ago. If you take the trouble to unravel this snarl, that’s what you find at the center of it. The war—and the role that Tajok played in it.” Baldwin paused to marshal his thoughts. Then:

“Tajok’s life-extension experiments yielded results that were undeniably beneficial. Tumanzu was proof of that. So was Tajok himself. Ten years of servitude in the shiroz mines failed to kill him. That was an unprecedented feat of endurance. It required augmented strength, extraordinary recuperative powers, and an ability to keep on keeping on that rivaled the rocks he was mining. Obviously, Tajok had been taking doses of his own medicine.”

“Obviously?”

“Well, it’s obvious to me *now*.” Baldwin gave a snort of self-reproach. “Isn’t that always the way? Life isn’t a process of discovery. Not for me. My life has been the process of making all the discoveries that should have been obvious from the outset.”

Collins remained silent, but it was a companionable silence that encouraged Baldwin to continue.

“At the conclusion of the war—when the Dokharans retook their homeland and ousted the Ambulan invaders—Tajok had to make himself scarce. His elixir had to be left behind.”

“His elixir?”

“Let’s call it that. I’m not really sure what it was. A drug? A combination of drugs? A combination of drugs and herbs? A combination of drugs, herbs, and a lamp with a genie in it?” Baldwin shrugged. “Your guess is as good as mine.”

Collins nodded. “But whatever it actually was, he couldn’t take it with him.”

“Right. Too bulky to carry, perhaps. Sure to be confiscated if he was caught. Or maybe he was just pressed for time. Be that as it may, he had to flee without it. And so he concealed it. The hideaway he selected for it was a makee-

va—one of the makeeva growing in the cemetery plot that belonged to his family. He poured his ‘elixir’ into a number of vials, and inserted them into the maw of the makeeva. The heavy-duty glass would be proof against the plant’s corrosive acids. The location itself would be proof against tampering. With the exception of Tajok himself, his family had been exterminated. No funerals involving this particular makeeva would be held for the foreseeable future.”

“And,” Collins added, “it was the gravesite of a clan of heretics whose latest and most infamous member was a war criminal. No one was likely to disturb it.”

“And no one did.” Baldwin seized his mug of akiku and lowered its contents by several inches. Delicious. Smacking his lips, he said: “Tajok was captured and sentenced to ten years mining shiroz. Seven years later, he met Luhor. Five years was longer than most prisoners lasted. Luhor was a total wreck after only three. When the two of them were released, Tajok was still in reasonably good condition. Luhor wasn’t. Luhor didn’t have long to live.” Baldwin emptied his mug and scrutinized the interior as though attempting to read the dregs in the bottom. “Tajok and Luhor made a pact. They exchanged identities. The substitution benefitted both of them. What Luhor got out of the deal was a chance to spend his few remaining years in comfort. What Tajok got out of the deal was a chance to retrieve the vials that he’d stashed in the cemetery.” Baldwin’s hands met and married, as though sealing a bargain. “The deception worked. Why wouldn’t it? No one on Izmir questioned who was who. Tajok had spent a longer period of time in the mines than Luhor, but Luhor was in much worse shape than Tajok. When the one who was frail claimed to be Tajok, he was taken at face value.”

Collins—an islander born and bred—tended to be nautical-minded. He said: “Tajok was flying false colors and getting away with it.”

“So he was,” Baldwin agreed. “And then—just as Tajok was congratulating himself on his cunning—Tumanzu came calling. That must have been a very unpleasant surprise. Tumanzu wasn’t merely an old adversary who bore Tajok a spite. He was a much bigger threat to Tajok than that. *Tumanzu could identify him*. By experimenting on Tumanzu

and extending his lifespan, Tajok had created a witness who could be his nemesis. He had to get rid of Tumanzu! He had no choice.”

Collins hooted a laugh. “A classic case of biter bit.”

“Tajok couldn’t fool Tumanzu. And he couldn’t very well refuse to see him. A confrontation with Tumanzu was unavoidable. That being so, Tajok agreed to a meeting—at a time and place of Tajok’s choosing. That much, at least, he could still control. Tajok and Luhor traded places, resuming their actual identities only long enough to give Tumanzu the showdown he sought. Tumanzu was given an opportunity to gloat over the discomfiture of his sugami.”

Baldwin drooped in his chair—a healthy man feigning illness. More precisely, he was a healthy man imitating a healthy Dokharan who was feigning illness. “Tajok must have pretended to be feebler than he actually was. Even so, Tumanzu got the distinct impression that Luhor was the weaker of the pair. Luhor’s fur was discolored. He was shedding. His voice was husky. His coordination was poor. Tumanzu concluded that Luhor was likely to predecease Tajok. *Not* the other way around. I know because Tumanzu told me so. Sadly, I didn’t pay sufficient attention to that remark. I didn’t see the significance of it at the time.”

In the contemplative tone of someone thinking aloud, Collins said: “Tumanzu had his say and took his leave, supposing that his quarrel with Tajok was finally resolved. But it wasn’t. Tajok hired Usiga to murder him.”

“Yes—but the first attempt misfired. Escoli zigged when she should have zagged, spoiling Usiga’s aim. The contingency plan called for Usiga to proceed to Dokhara and try again. Tajok was betting that Usiga would eventually succeed. Of course he was. What else could he do? The mizuni had been alerted. The editors of the *Hoyabusa* would soon be publishing the bombshell Tajok had sent them. Tajok *had* to go through with it. He couldn’t change his plans now.”

Collins slapped him with an upraised palm. “The mizuni?” he said, requesting clarification. “Who alerted the mizuni?”

“Tajok. Who else?” Baldwin raked a hand through his hair, did not seem better groomed for fussing with it. “Tajok lied when he told me that he was making ‘Tajok’s’ funeral arrange-

ments. He’d already made them. The mizuni in charge of the cemetery had received written instructions . . .” Baldwin shut his eyes and performed intricate sums behind closed lids “. . . it must have been fifty-two days before my first meeting with Tajok. They were told to make preparations for Tajok’s makeevasukku. He correctly predicted that they would file a protest with the Genjuko, but he couldn’t be sure what the result would be. That alone might not generate enough controversy for his purposes. And so he added fuel to the fire.” Baldwin’s cupped palms exploded outward, illustrating a reinvigorated blaze. “The same courier who had contacted the mizuni delivered a sealed envelope to the offices of the *Hoyabusa*. The editors were requested to refrain from opening it for fifty-seven days. When they did, they found that it contained an inflammatory editorial announcing that Tajok would be receiving the same last rites as his victims. Tajok had written it himself, of course, and the public was infuriated by it—just as he’d intended. But he made a mistake. He mentioned the exact day of ‘Tajok’s’ death. Tumanzu noticed that immediately. How had the author of the editorial acquired that information?” With a never-mind wave of his hand, Baldwin canceled his own question. “As mysteries go, that one wasn’t really very mysterious,” he acknowledged. “Tajok knew when ‘Tajok’ would die because that was when Tajok planned to poison ‘Tajok.’”

Collins pursed his lips thoughtfully. “The ordeal in the mines,” he speculated, “must have changed Tajok.”

“To be sure. Not, perhaps, out of all recognition, but enough for him to masquerade as Luhor. As long as he was careful. As long as he was lucky. As long as he didn’t come face-to-face with someone who’d known him during the war. The odds of that were remote. Most of his old acquaintances were dead. Of course they were. He’d killed them himself. If he dressed differently, walked differently, cultivated different mannerisms and made few public appearances, his chances of success were good. Or they *had* been. They were no longer. Not as long as Tumanzu remained alive.”

“Which he was.”

“But Tajok didn’t know that—not until I told him.” Baldwin pointed a bent finger of ac-

cusation at himself. "When Tajok arrived in Dokhara, I met the ship and made the grave mistake of mentioning that Tumanzu had been summoned by the Genjuko. Tajok's response was to do a vanishing act. He engaged the services of Nishyuki, went into seclusion, and emerged from it only once. Or so I surmise. It was an unavoidable risk. He had to re-establish contact with Usiga, reactivate their contract, and make sure that Usiga read-dressed himself to the task of eliminating Tumanzu. After that, Tajok simply waited. Presumably, he was practicing the statement he would be making before the Genjuko. Rehearsals continued until he received confirmation that Tumanzu was dead."

Collins gave Baldwin a look of appraisal and approval. "Tumanzu's death *did* dispose of the only witness who could expose Tajok, but it backfired on him. From then on, a top-notch investigative journalist was nose-down and baying on his trail."

"Me?" Baldwin belittled his own abilities with a loud raspberry. "If I'm such a hot-shot reporter, why wasn't I quicker on the uptake? What about all the discrepancies that I failed to heed? I noticed them, but I failed to *take* notice of them—if you know what I mean."

"Such as . . . ?" Collins prompted.

Baldwin started counting on his fingers. "When I spoke with 'Luhor'—both times—I detected nothing wrong with him. The feebleness that had been so apparent to Tumanzu was conspicuous by virtue of its absence." Another finger joined the first. "When I spoke with 'Luhor'—the second time—he said that he'd decided to attend 'Tajok's' funeral because trouble was brewing and he felt obligated to oppose the obstructionists. Yes—but the *Izanugi* had only just docked. When the *Izanugi* departed from Izmir, he'd had no way of knowing that trouble was brewing—not unless he'd been stirring the pot himself." Baldwin raised a third finger. "His manner, too, was revealing. Tumanzu said that taunting Tajok had provoked no emotional response. Tumanzu wasn't surprised. He would have expected none. Tajok was known for his aloofness. He kept his feelings to himself. That is exactly how 'Luhor' behaved with me. Distant. Disengaged. Detached. But me—I didn't make the connection."

Collins extended a condolent hand. "You

did eventually. You deduced what had happened and went to the Genjuko with your conclusions. When Tajok came before them, he was taken into custody."

This attempt at commiseration found no resonance in Baldwin. He had failed to save Tumanzu, wanted no consolation prizes. His gaze shifted to the horizon.

The sky was aswirl with bloodshot clouds. The setting sun had bequeathed to them its dying glory. *A magnificent spectacle*, Baldwin was thinking. *Escoli would have loved it.*

Turning back to Collins, Baldwin saluted him with a perky forefinger. "You did a fine job with the *Izmir Herald* in my absence," he said. "Sorry I was gone so long, but I had to stay in Kazunori for the trial. I was required to give testimony."

"The verdict, I presume, was guilty."

"It was."

"And Tajok's punishment?"

"Makeevasukku. The judges granted Tajok's request. He repeatedly said that he wanted to be absorbed by a makeeva. So be it. He has been sentenced to be fed to a makeeva—while he is still alive."

Collins shuddered. "A horrible fate. Not undeserved. But horrible."

Baldwin chuckled mirthlessly. "A fate that is not fated to befall him. Not soon. Not ever, if you ask me."

"Why not?"

"His hole card was an ace."

Collins' face was vacant and uncomprehending. "His whole card? As opposed to . . . what? Part of a card?"

Baldwin was mildly annoyed at himself. He sometimes forgot that Collins was—in many respects—more Izmirite than Terran. *I should have guessed*, he thought. Why would a child raised on Bukkara understand a reference to a Terran pastime?

"Poker," Baldwin explained. "In stud poker, the hole card is dealt face down."

"I see."

"No—you wouldn't. The card is dealt that way to keep you from seeing. Its value, I mean. You can see the back of the card, but you can't see which card it is."

Baldwin waited for Collins' eyes to kindle with enlightenment. They didn't. Collins said: "Sounds like one of those things you can only learn by doing. Bukkarans are fond of games.

Maybe you should introduce them to this one.”

“I already did. I taught the rudiments of poker to Tumanzu. He got to be a pretty good at it, but he never developed a knack for bluffing. Unlike Tajok. That poker-faced bastard could bluff his way through an earthquake. He’s had plenty of practice. Thirteen years of it. Tajok has been running an elaborate bluff ever since the Ambulans lost the war.”

“Except when he played his hole card. Didn’t you say he had an ace in reserve? If I catch your drift, he wasn’t bluffing about that.”

“No. Tajok has developed a procedure that prolongs lives. It really does. No kidding. It’s not a bluff. It works. The genjuki consider that a mitigating factor—so much so that it has earned Tajok a reprieve. A more or less indefinite reprieve. Tajok is still in custody. He’s under house arrest. The ‘house,’ in this instance, is his laboratory. He’s back at work, attempting to improve his ‘elixir’.” Baldwin’s fingers clenched futilely. “Tajok has evidently come to a sensible little understanding with the genjuki. They won’t put him to death as long as he keeps death from being visited upon them.”

Collins solemnly shook his head. “Let’s be thankful for small favors. At least Tumanzu didn’t live to see that. He can rest in peace.”

“There is no rest for the dead,” Baldwin muttered, quoting Tumanzu.

“There isn’t?”

“Not if Tumanzu was right.” Baldwin’s eyes had become blurs of retrospection. “We were in a hozen—Tumanzu and I—when the subject of poker was first raised between us. Tumanzu had been telling me why our funeral rites are repugnant to Dokharans. ‘There is no rest for the dead,’ he said. ‘He proved his point with examples that were more than a little grotesque.’” Baldwin barked a fey laugh. “If

Tumanzu only knew what the outcome has been—what his petty quest for revenge actually accomplished . . .” Baldwin laughed again. “No rest for the dead. Tumanzu was a Dokharan. He doesn’t have a grave, but if he did, he’d be spinning in it.”

In the courtyard of the Mazabashi Inn—not far from where they were sitting—a water sculpture was playing. It moved restlessly, like a soul made uneasy by a guilty conscience. Multiple nozzles twisted and turned, capricious and dithering, churning and frolicking, none of them synchronized, weaving intricate designs with threads of white water that dissolved and vanished even as they were taking shape.

The magnificent sunsets visible from the Mazabashi Inn were never the same from day to day.

The patterns formed by the Inn’s water sculpture were never the same from moment to moment.

Baldwin had seen Tajok change into Luhor, and Luhor change into Tajok, and an evil-doer change into a do-gooder who might change the lives of the people who detested him by conferring immortality—or at least enhanced longevity—on them.

Yes—and Baldwin himself had changed.

He was even beginning to acquire an appreciation for water sculptures.

No one is ever always anything, he thought.

The fountain frothed and drew hissing breaths, musing to itself and whispering secrets. “Never the same,” gushed the water, contradicting itself by repeating the same message again and again. “Instability is the only condition that’s stable. Nothing is ever the same.” ■

Artificial intelligence (hereafter AI) has been a theme in philosophy and literature since long before science fiction existed. Legends of automatons appear in Greek mythology (the bronze giant Talos who defended the island of Crete, the moving statues of Daedalus), ancient Chinese myth (a life-size human figure made of leather and wood by Yan Shi), and Jewish legend (where King Solomon was said to have designed artificial birds and lions to attend upon him). Al Jazari's *Book of Knowledge of Ingenious Mechanical Devices*, c. 1200 CE, described a boat with four programmable artificial musicians. Leonardo da Vinci sketched a design for a mechanical knight around 1500 CE.

The Golem of Jewish legend and the monster of Mary Shelley's *Frankenstein* are possibly early examples of artificial intelligence (depending largely upon one's definition of "artificial"), but it fell to L. Frank Baum to introduce the first truly autonomous AI in literature: the clockwork Tik-Tok from *Ozma of Oz* (1907) and later Oz books. Karel Capek's play *R.U.R.* (written in 1920) gave AIs like Tik-Tok the name by which they'd be best known in SF: robots—which comes from the Czech words "robota" (compulsory labor) and "robotnik" (workman).

Most early robot stories (including *R.U.R.*) were little more than retellings of the Frankenstein story, as robots rebelled against humanity again and again. It wasn't until the late 1930s that two SF writers broke out of that mold: Lester del Rey's "Helen O'Loy" (*Astounding*, 1938) and Eando Binder's "I, Robot" (*Amazing*, 1939) and sequels. In both, robots were intelligent, sympathetic characters.

Isaac Asimov's Positronic Robot stories—

beginning with "Robbie" in *Super Science Stories* (1940) and continuing in many subsequent stories in *Astounding* through the 1940s—permanently changed the field's treatment of artificially intelligent robots, and the killer robot was relegated to low-budget Hollywood productions.

By the end of the Second World War, computers had entered the popular consciousness. Among the earliest SF examples of AI in computer form are the Games Machine from A.E. Van Vogt's *The World of Null-A* (*Astounding*, 1945) and "A Logic Named Joe" by Murray Leinster (*Astounding*, 1946). Not only did the Leinster story describe a recognizable version of today's Internet, but it also introduced the questions of identity, volition, freedom of information, and AI ethics that SF writers and AI researchers both wrestle with even today.

Just about every SF writer from Anderson to Zelazny dealt with AI in one way or another, a decades-long conversation of ideas that's continued into the present, and shows every sign of continuing forever. An incomplete list of influential SF AIs has to include The City Fathers (James Blish, *Cities in Flight*, beginning 1955); Cohen (Chris Moriarty, *Spin State* and sequels, beginning in 2005); Colossus (D.F. Jones, *Colossus*, 1966); Deep Thought (Douglas Adams, *The Hitchhiker's Guide to the Galaxy*, 1978); The Ghostwheel (Roger Zelazny, *Chronicles of Amber* series, 1985); HAL 9000 (Arthur C. Clarke, *2001: A Space Odyssey*, 1968); H.A.R.L.I.E. (David Gerrold, *When H.A.R.L.I.E. Was One*, 1972); Holly (*Red Dwarf*, 1988); M-5 ("The Ultimate Computer," *Star Trek*, 1968); Manfred (Melissa Scott, *Dreamships*, 1992); Marvin the Paranoid Android (Douglas Adams, *The Hitchhiker's Guide to the Galaxy*, 1978); Master Control Program (*Tron*, 1982); Max (*Max Headroom*,

1987); Merlin (J. Beam Piper, *Junkyard Planet* aka *The Cosmic Computer*, 1963); Minerva (Robert A. Heinlein, *Time Enough for Love*, 1973); Multivac (Isaac Asimov, stories beginning in 1955); Mycroft (Robert A. Heinlein, *The Moon is a Harsh Mistress*, 1966); Neuromancer (William Gibson, *Neuromancer*, 1984); Orac and Zen (*Blake's 7*, 1977–1981); Polymat (Frederik Pohl, *Gateway* and sequels, beginning in 1977); R2-D2 and C-3PO (*Star Wars*, 1977); Robbie (*Forbidden Planet*, 1956); The Robot (*Lost in Space*, 1965–1968); Tim (*The Tomorrow People*, 1973); and Webmind (Robert J. Sawyer, *WWW Trilogy*, beginning in 2009). Why so many fictional robots have names starting with “M” is a mystery for another time.

In today's SF landscape, AI is everywhere. From the godlike matrioshka brains of modern high-tech space opera to the return of killer robots (*Robopocalypse* by Daniel H. Wilson, 2011), from Transformers to Droids, from intelligent clouds of nanodust to AI personal assistants, artificial intelligences continue to partner with humanity, assist it, threaten it, and make it obsolete. It's looking increasingly more likely that AIs will be the first alien intelligences we contact. It's an almost certain bet that there are AIs in this issue's stories.

In the best tradition of our field, the conversation about AI and its implications continues to play out as it has for at least the last half-century.

Ancillary Justice

Ann Leckie

Orbit, 416 pages, \$15.00 (trade paperback)

Kindle: \$8.89, iBooks: \$8.99, Nook: \$9.99 (e-book)

ISBN: 978-0-31624662-0

Series: Imperial Radch 1

Genres: Alien Beings, Clarke's Law, Man and Machine, Space Opera

One of the most appealing things about AIs, at least for SF readers and writers, is that they don't think the way we do. We are fascinated by exploring alien minds, particularly minds that spring from the same background as ours. From Multivac to Webmind, SF writers have held up an AI mirror to our own minds.

Ancillary Justice is the latest step on this road, and a giant step it is. You definitely don't want to miss this one.

In the far future, the Empire of the Radch rules the galaxy with brutal efficiency. The Radch are (in their own eyes, at least) a superior race of humans who have taken up the burden of bringing stability and civilization to the myriad worlds around them. The Lord of the Radch, Anaander Mianaai, is an immortal intelligence that exists across thousands of cloned bodies.

On a frozen planet on the outskirts of the empire, a woman named Breq comes to the end of a decades-long quest. Once, Breq was an ancillary—one of many captured bodies (aka “corpse soldiers”) under the command of the AI in charge of the Radch troopship *Justice of Toren*. Then, during a climactic battle, *Justice of Toren* was betrayed, and Breq is the only remaining fragment of the great AI.

Breq/Justice of Toren has sworn to take revenge on the author of her betrayal: none less than the Lord of the Radch itself. After all this time, after evading enemies and making allies, she has located an ancient weapon that might just allow her to destroy Anaander Mianaai once and for all.

On the structure of this space opera plot, Ann Leckie has built a fully realized and utterly rewarding universe filled with more wonders and brilliant ideas than any ten lesser novels. Along the way, she wrestles with questions of identity, individuality, gender, morality, and what it means to belong to any family, group, nation, or empire.

Leckie tells the story in two narratives, past and present. In the past thread—in my opinion, the most rewarding of the two—we see *Justice of Toren* as she was at her height. With the most artful use of language, Leckie carries off the near-impossible task of showing us what it's like to be a super-intelligent being animating both a giant starship and numberless separate bodies, some of them machines and some human bodies. Leckie doesn't just tell us that Breq is a single, pale shadow of her former self—she lets us feel for ourselves the vast sense of loss that Breq feels . . . and that powers her desire for revenge.

Ancillary Justice isn't by any means a simple beach read. This is the kind of book that expands your mind, and makes you work for

it. Publicity compares Ann Leckie to C.J. Cherryh, and that's certainly an apt comparison—but I was also reminded of Iain M. Banks and Elizabeth Bear.

Ancillary Justice is the first in a series . . . if the next books are even half as good, they'll be well worth waiting for.

The Other Half of the Sky

edited by Athena Andreadis

Candlemark & Gleam, 460 pages, \$22.95 (trade paperback)

iBooks, Kindle, Nook: \$6.99 (e-book)

ISBN: 978-1-936460-44-1

Genres: Original Anthology

A Chinese proverb (or Mao Zedong, depending on your source) says, "Women hold up half the sky." *The Other Half of the Sky* is an anthology that presents SF stories with women as protagonists. The focus is strictly on science fiction, which shouldn't bother *Analog* readers. In fact, this book nicely fills the void left by the demise of Roby James's late, lamented *Warrior/Wisewoman* anthologies. If anything, it's better.

Look at this lineup of authors: Alexandr Jablov, Ken Liu, Jack McDevitt, Cat Rambo, Melissa Scott, Joan Slonczewski, Martha Wells . . . and nine other names perhaps less familiar. In all there are 460 pages packed with a great selection of cutting-edge SF stories, most of which wouldn't be out of place in the pages of *Analog*.

It's hard to select standout stories; they're all of such good quality. But I want to talk about three that will give you a feeling for the breadth of this anthology.

Joan Slonczewski's "Landfall from the Blood Star Frontier" is set in the same universe as her novel *The Highest Frontier*. If you miss Jenny Kennedy from that book, you'll get to see more of her in action. As you'd expect, the story is a heady brew of biotechnology, politics, and suspense set against the slow invasion of Earth by an alien invasive species.

Melissa Scott's "Finders" is set in a far-future world in which Humanity survives by salvaging the almost-incomprehensible technology of the galaxy-spanning Ancestral civilization that fell a thousand years ago. Among the Ancestral ruins are elements such as BLUE and GOLD, which are as much computer code as

they are real artifacts. Another total-immersion story, this tale details salvager Cassilde Sam's quest to find a mother lode of GREEN, the rarest and most potent element. Rival gangs of salvagers are after the same lode, but Cassilde has a reason besides money to find the GREEN—her lover's life is on the line.

"Cathedral" by Jack McDevitt is a tearjerker set in a near-future world that's turning its back on space exploration, and the woman who uses a close encounter with an asteroid to breathe life back into the dream.

In the world of SF readers, some are stuck in the third-grade "girls are icky" phase; they continue to insist that women don't belong in SF, either as protagonists or as writers. Anthologies like this one are the best treatments for this particular delusion.

Ascension: A Tangled Axon Novel

Jacqueline Koyangi

Masque, 336 pages, \$14.95 (trade paperback)

iBooks, Kindle, Nook: \$6.99 (e-book)

ISBN: 978-1-60701401-0

Genres: SF Romance, Space Opera

Alana Quick has problems. So does her whole universe.

Once, times were good. Alana is a starship surgeon, a skill she learned from her Aunt Lai. When the big ships needed repair, Alana and Lai were there to help. The money was good, the work was interesting . . . and if Alana never got to travel in the Big Quiet, at least she dealt with the ships that did.

Then the economy went south, and Transliminal Corporation stepped in with a different shipping technology and the money to buy out competitors. Traditional repair work dried up.

At the same time, Alana and Aunt Lai became victims of a degenerative muscular condition, one that requires a steady regimen of expensive drugs. And to top it all off, Alana's sister Nova left on one of the big ships and hasn't been back since.

When Nova's ship *Tangled Axon* arrives, Alana learns that Nova is missing . . . and the Captain and crew want her help to find their crewmate. So Alana boards *Tangled Axon* on a journey of adventure and romance.

Of course they find Nova. There's betrayal,

and suddenly the ship and crew are running for their lives, pursued by all the forces Transliminal can command.

The plot is only half the appeal of this book—the other half comes from the social and familial structures of *Tangled Axon* and the worlds they visit. *Tangled Axon* isn't just a ship, it's also a polyamorous family . . . or maybe families . . . and much of the fun is figuring out how this fascinating and unusual social universe works.

Definitely a fun book.

Our Final Invention: Artificial Intelligence and the End of the Human Era

James Barrat

Thomas Dunne, 336 pages, \$26.99 (hard-cover)

Kindle: \$11.04, iBooks, Nook: \$12.99(e-book)

ISBN: 978-0-31262237-4

Genres: Nonfiction

I have always maintained that one of the dubious privileges of being an SF reader is being able to worry about important things forty to fifty years before the rest of the world. Atomic war, overpopulation, pollution, genetic engineering, asteroid impacts, climate change . . . well, now you can add artificial intelligence to the list. If you count those pulp stories of killer robots destroying Humanity, SF readers have been concerned with the possible downsides of AI for a good ninety years or so. And now the popular press has (finally) caught up with us.

James Barrat is a journalist, writer, and producer of documentaries for the likes of PBS, National Geographic, and Discovery. In 2000, he separately interviewed both Arthur C. Clarke and Ray Kurzweil, and started to get concerned about AI research. So he went researching, interviewing AI researchers, technologists, Silicon Valley wunderkinds, and

others—although curiously, the only SF writer referenced in his notes is Vernor Vinge.

Our Last Invention is the result.

Barrat's basic argument is a familiar one. Sometime soon (probably within the next decade, possibly tomorrow), someone in the world will produce an AI capable of self-directed thought (what he calls Artificial General Intelligence, or AGI). After that, AGI will lead to the development of Artificial Superintelligence (ASI). These AIs will design and produce their own successors, and before you can sing a chorus of *Daisy Bell*, they'll take over the world. By the following Tuesday we'll enter the technological singularity, when knowledge and technology advance faster than the human mind can comprehend. To the AI and AI-enhanced inhabitants of the post-singularity world, ordinary humans will be as insects, and who knows what's going to happen to us?

This whole cluster of ideas is old hat to *Analog* readers, but virtually unknown to the mundane world. Barrat does a fine job of presenting the basic concepts in an entertaining and accessible way, and it's well worth following his account of how the scientific and defense communities are working through concerns about the threats that AI presents.

Far more interesting to the SF reader are the final chapters, in which Barrat deals with safety measures and defenses. It's definitely interesting to see current-day technologists addressing the concerns that have occupied SF's heroes for so many years.

Now my MacBook, Quislet (who is definitely artificial but nowhere as intelligent as it thinks it is) tells me that I've come to the end of my space, so that's it. See you next time. ■

Don Sakers is the author of *The Eighth Succession* and *Dance for the Ivory Madonna*, both of which feature AIs. For more information, visit www.scatteredworlds.com.

Dear Mr. Quachri,
In your essay “On Genre” you cite *Analog’s* publishing guidelines as being: “stories in which some aspect of future science or technology is so integral to the plot that, if the aspect were removed, the story would collapse.” I believe that either some aspect of these guidelines, or your interpretation of them, is at odds with the publication of stories that are interesting on a noncerebral level. I am reminded of Juliette Wade’s “The Liars,” which appeared in your October 2012 issue, the story that convinced me to buy a subscription to this magazine. I do not believe that this story would have ever passed under your “iron fist,” (meant in the best way possible, of course) and into my juvenile library.

The story of an alien people that have adapted to the stress of contact with another by taking it out on a select group of their own people probably dates back to the first contact between our Homo-sapien ancestors and the now extinct Neanderthals! The science fiction aspect only serves to make the topic relevant to the modern age. I can think of a million other examples, but I think this one from your own magazine makes the point strongly enough that your guidelines desperately need revision. I suggest mine: “stories that contain some aspect of future science or technology that serves—in some meaningful way—the plot.” I realize that this publication has been outwardly a member of the “hard” science fiction community, but remember that modern readers have no *New Worlds* type magazine to turn to, besides maybe your slightly more moderate sister magazine *Asimov’s*, and this is a very small step indeed toward the “New Wave” that I am asking. I encourage you to look at some of your favorite SF stories and see how they hold up under your harsh guidelines.

Also, speaking of hard SF, I would like to mention a lapse of scientific accuracy that has come to my attention. It is: the situation described in Carl Frederick’s “Fear of Heights in the Tower of Babel” is nigh impossible, given the method of modern A.I. technology. A.I.s are no longer “programmed” per se, and it is a grave error to say

that these translating machines (which we do have today by the way, in the guise of Google Translate) were “programmed by different people.” In fact, these strange creatures are self-taught the ways of language by being allowed to browse huge databases of words on the internet. For an in-depth article (and incredible writing inspiration, which I myself have not taken on yet) I urge you to consult the August 10-16 issue of *New Scientist*. Look for “Not Like Us: we are creating minds that no human can understand.” The closest literary parallel to this that I relate is David Gerrold’s “The God Machine,” although I am no scholar and other fans can probably think of better analogies.

Tobias Banks

You make a good point, Tobias. I don't quite think we're going to revise our guidelines just yet, but it's worth remembering that they're just that—guides. They're not physical, inviolate laws of the universe, even if it's important that we at least aim for them as a goal. Sometimes good stories that don't fit them perfectly are going to rear their heads, and that's not a bad thing. “The Liars” appeared at the end of Stan Schmidt’s tenure as editor, and it would absolutely have been a shame if he’d passed on it because he was applying the guidelines too stringently.

Dear Editor,

In regard to H. G. Stratmann’s guest editorial [“Does Medicine Have a Future?”] in the November 2013 issue, he briefly referred to Canada’s single payer system as being characterized by “high overall tax rates for medical care that is ‘free’ when needed . . . can be plagued by long waiting lists for ‘nonemergency’ testing and operations, rationing of the mostly costly procedures and issues regarding quality of care . . .”

As Dr. Stratmann knows, all systems have their limitations. All systems ration health care. In America, it’s done by not providing it to millions of people, though that may be changing. However, I would point out that Canadians, overall, express a much higher satisfaction rate (about 75%) with their health care system than

Americans do. In such discussions, I always find that there is also a neglect of the *advantages* of such systems.

One is efficiency. In the USA admistration costs soak up about 31% of healthcare dollars, but in Canada it's about 17%. This is partly due to the much simplified billing and payment system, where the Canadian provinces are the single insurer. There are no complicated forms to be filled out by large billing departments. A surgical procedure here generates a bill of about one page, covering doctors, hospitals, nurses, supplies, etc. With multiple insurers in the States, doctors billing seperately and so on, many documents are generated, all in the different formats demanded by each insurer. Many years ago, Walter Cronkite did a special on this, matching a hospital in Vancouver with one in San Francisco. The billing department in San Francisco consisted of about three hundred people in a five-story office building. In Vancouver, twenty people performed the same function, mainly for visiting out-of-province patients. I do not think that this has changed much since then.

More telling, though, is the more consistent preventative medicine that can be practiced when most people have access to personal physicians and aren't afraid of the possible costs of a visit to the doctor for a checkup. A case in point is prenatal care. In Canada, almost all expectant mothers receive prenatal care. This results in an infant mortality rate far lower than in the USA, 4.7/1000 (rank 22nd) vs. 7.1/1000 (rank 43rd). This also doesn't take into account the number of children requiring neonatal intensive care, which is far, far more expensive than prenatal care (hundreds of thousands to as much as a million dollars for intensive care against a few hundred dollars for prenatal).

The much lower rate of homicide in Canada, especially by gun, is not medically related but is a significant difference in health costs.

Canadian physicians and nurses can move to the USA and begin working immediately. Their high level of training is basically the same as American health care providers and they are highly sought after by recruiters from south of the border. So their "quality" is at least equal to American trained. This is not to take away the innovation and progress driven by the system in the states. This is a resource that all other countries depend on. Our population of thirty

million or so, in a country larger than the 48 states, makes it hard to compete. Yet Canadian universities and hospitals are deeply involved in medical research and innovation.

There are pros and cons to all systems, in every country. We should try to take what is best from each and contrive a system of delivering help and support to everyone, in a way that works locally as well as nationally.

Mark Fagan
Toronto, Canada

P.S. I've tried to confirm these figures, with fairly quick Google searches. I believe they are representative, if not totally accurate and current.

Dear Jeffrey Kooistra,

What a delight it was to read your "Alternate View" column in the September 2013 issue on the twenty-fifth anniversary of *Mirror Matter*; the book Robert Forward and I coauthored. It certainly didn't occur to me, back then, that anyone would be sending any kind of twenty-fifth anniversary shout-out. So thanks!

I found your comments about the book, its "predictions" and what has transpired in the last quarter-century to be pretty much on target. I concur with your quibble about the subtitle—it should have been "Pioneering Antimatter Technology." But we went along with the suggestion from the publisher, and didn't think about it afterwards. So it goes.

Bob and I had no concerns about the physics in the book—he knew his stuff, and antimatter propulsion was a topic he stayed interested in the rest of his life. True, he had turned his main focus in the years following the book's publication to other space-related technologies, particularly the uses of tethers. But we were talking about the book and its subject matter the last time we met over dinner, about a year before his death.

And the social science/history crystal ball-gazing? Eh. We kinda went with our dreams. We could hope! And we did. History has a way of going off in directions no one expected. Sometimes it's better than we hoped for, sometimes it's worse.

So: "To get to a *Mirror Matter* future will require the setting of the goal to actually make it happen." Spot-on, sir. That may never happen. I devoutly hope it will, as did Bob. He would have been delighted to see the rocket equation made obsolete!

Joel Davis ■

UPCOMING EVENTS Anthony Lewis

NOTE: Membership rates and other details often change after we have gone to press. Check the websites for the most recent information.

23–26 May 2014

BALTICON 48 (Baltimore area SF conference) at Hunt Valley Inn, Hunt Valley, MD. Guest of Honor: Brandon Sanderson; Artist Guest of Honor: Halo Jankowski; Music Guest of Honor: Kenneth Anders. Membership: \$65 adult; \$33 child (6–12 y.o.). Info: <http://www.balticon.org/index.html>; PO Box 686, Baltimore MD 21203-0686.

23–26 May 2014

WISCON 38 (Wisconsin area SF conference) at The Concourse Hotel, Madison, WI. Guests of Honor: Hiromi Goto and N.K. Jemisin. Membership: \$50 18+; \$20 7–17. Membership is capped at 1,000; there is no guarantee of at the door memberships. Info: <http://www.wiscon.info/index.php>.

30 May–1 June 2014

CONCAROLINAS (North/South Carolina area SF conference) at Charlotte Hilton University Place, Charlotte, NC. Guest of Honor: George R.R. Martin. Membership: \$35 13 y.o.+; under 13 free with paying member. Info: <http://www.concarolinas.org/>; PO Box 26336, Charlotte NC 29221-6336.

6–8 June 2014

DUCKON 22 (family-friendly SF/Fsy conference) at Chicago IL. Author Guest of Honor: David Gerrold; Artist Guest of Honor: Jennifer Allen, Filk Guest of Honor: Dan the Bard, TM: Tom Smith, Non-Bipedal Guest: Sheila the Tank. Membership: \$50 in advance; \$60 at the door. Info: <http://www.duckon.org/pages/>;

info@duckon.org; P O Box 4843, Wheaton IL 60189-4843.

20–22 June 2014

FOURTH STREET FANTASY (Fantasy conference) at Minneapolis, MN. Membership: \$65 until 31 May 31, 2014; \$100 thereafter. Info: <http://www.4thstreetfantasy.com/2014/>

20–22 June 2014

NEFILK 24/CONTATA 7 (Northeastern filk conference) at Morristown NJ. Guests of Honor: Amy McNally & David Perry, TMs: T.J. & Mitchell Burnside Clapp, Listener Guest: Sheryl Ehrlich, Interfilk Guest: Peter Always. Membership: \$65 until 14 June 2014; \$70 at the door. Info: <http://www.contata.org/>; info@contata.org

27–29 June 2014

APOLLOCON (Houston area SF/Fsy/Horror conference) at Houston, TX. Membership: \$30 until 1 May 2014; \$40 at the con. Info: <http://www.apollocon.org/>

14–18 August 2014

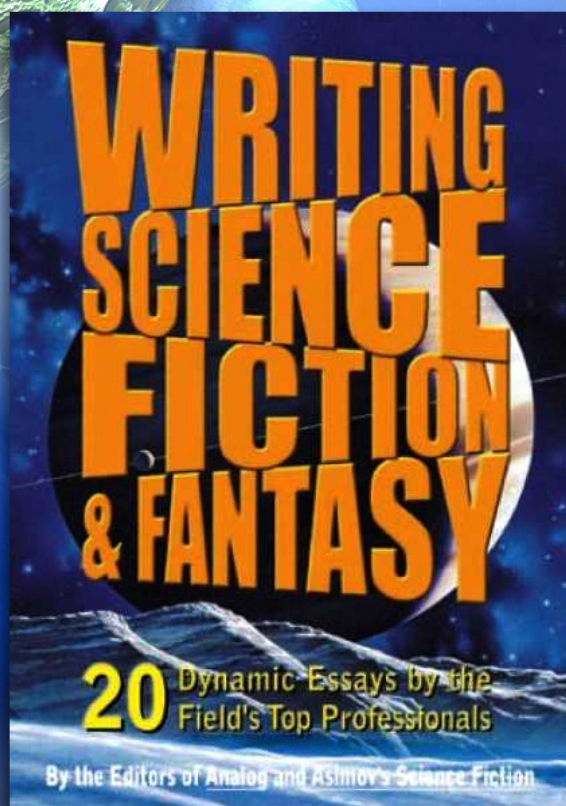
LONCON 3 (72nd World Science Fiction Convention) at International Conference Centre, ExCel, London Docklands, U.K. Guests of Honor: Iain M. Banks, John Clute, Chris Foss, Malcolm Edwards, Jeanne Gomoll, Robin Hobb, Bryan Talbot. Membership: until 30 April 2013. Attending: \$160/£95 (adult); \$110/£65 (young adult); \$50/£30 (child); \$3/£2 (infant); \$390/£230 (family); \$40/£25 (supporting). This is the SF universe's annual get-together. Professionals and readers from all over the world will be in attendance. Talks, panels, films, fancy dress competition—the works. Nominate and vote for the Hugos. Info: <http://www.loncon3.org/>; Loncon 3, 379 Myrtle Road, Sheffield S2 3QH, United Kingdom ■

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