

THE ATLANTIC COUNCIL ART OF FUTURE WARFARE PROJECT:
WAR STORIES FROM THE FUTURE



The Atlantic Council Art of Future Warfare Project:

WAR STORIES FROM THE FUTURE

edited by August Cole

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Acknowledgments



In an era of big data and sensors that provide an infinite set of metrics, there is a growing conviction that modern warfare is best understood, and won, with complex statistics and models. Yet, thankfully, at the same time there is new appreciation that warfare is as much art as it is science—perhaps more so in an era of accelerating technological advancement where the cutting edge is ubiquitous. Creative approaches to understanding armed and social conflict are needed, and that is where the authors whose stories appear in this collection can play a crucial role.

War Stories from the Future is a product of the Lund Emerging Defense Challenges Initiative at the Atlantic Council.

The Initiative's Director is Steven Grundman, who conceived and supervises the Art of Future Warfare project and who orchestrated the enterprise by which these stories came to life. Steve holds the M.A. and George Lund Fellowship, which is made possible by the support of philanthropist George Lund, whose thoughtful guidance and steadfast encouragement of this project significantly amplifies the impact of his generosity.

At the Scowcroft Center, Alex Ward, and Robbie Gramer were invaluable readers with trustworthy edits and insights. Not least, the Center's Director, Barry Pavel, has prioritized and encouraged the development of foresight about the future of international security. He set the perfect strategic context within which this project and anthology has flourished.

The future of the think tank is being written day by day, and the Atlantic Council publications staff proved our ambitions need not be bounded by convention. Thank you, Nonna Gorilovskaya and Romain Warnault, for publishing the Council's first fiction collection. There will be many more to come.

From the project's start, Andrew Liptak and Jaym Gates freely shared their experience and advice—and introduced many new writers to the Council and the project. Their "War Stories" anthology was the model for this collection.

August Cole,
Editor and Director of the Art of Future Warfare project



Introduction by Martin Dempsey

"The variety of worlds science fiction accustoms us to, through imagination, is training for thinking about the actual changes—sometimes catastrophic, often confusing—that the real world funnels at us year after year. It helps us avoid feeling quite so gob-smacked." – Samuel R. Delany

Some see science fiction as a fanciful attempt to escape from the less pleasant realities of the present, or at best, a vain attempt to foretell the future. Nevertheless, it is human nature to want to peer into the future, to know the way ahead. But whether you attribute the quote to Niels Bohr or Yogi Berra, "predictions have always been tough ... especially about the future." In truth, if any writer of science fiction accurately predicts events to come, it likely means they either did not push the boundaries of convention hard enough, or they simply got lucky.

As much as we may want science fiction to be predictive about what awaits us, or perhaps even prescriptive on how we should deal with impending challenges, the true gift of the genre lies in its ability to be provocative and its power to develop the professional imagination.

By provoking us to free our minds of constraint and convention, worthy science fiction allows us to create a mental laboratory of sorts. In this place, we can consider new problems we might soon face or contemplate novel ways to address old problems. It sparks the imagination, engenders flexible thinking, and invites us to explore challenges and opportunities we might otherwise overlook.

Directed energy weapons, electromagnetic pulse, and autonomous warfare—all things of science fiction just a few decades ago—are now beginning to materialize. Science fiction allows us to model future possibilities and explore the practical and tactical possibilities of emerging or future technologies. It should also cause us to consider the ethical implications associated with adopting new ways of approaching conflict.

The stories in this collection prompt us to conceptualize life after a crippling cyberattack, raise the specter of space-based warfare, and explore the consequences of covert cyberspace operations, remote warfare, and pervasive connectivity. They span a continuum of issues ranging from the means by which new technologies might find their way into human conflict to how those methods might impact combatants at a human and psychological level.

These issues require us to think broadly. The authors in this anthology invite us to shed the shackles which bind us to our current constructs and instead imagine things as they might be, for better or for worse.

At their best, science fiction stories explore the art of the possible, illuminate problems we might otherwise overlook, and entertain us at the same time. So, I hope you enjoy these stories. More importantly, I hope they make you think. Glean as many lessons as you can, but don't blindly accept the authors' conclusions. Challenge them. Wrestle with them. Refute them if you can. And build these insights into your mental arsenal so we can better understand how these evolutions—in some cases revolutions—of technology might affect our national security.

Martin Dempsey
September 2015



From a Remove

by Alec Meden

Donya Al Shirazi watched the missile streak toward her. Just five minutes. That was all she needed. Might as well have been an eternity. She concentrated on the Microdrive engines, and her craft cruised dangerously close to the blue glow of the Earth's atmosphere. The missile was coming in prograde, so it needed to make up a lot of distance, but the LACE/hydrogen rocket of the African Confederation's Tsetse 7 missile would allow it to make up the distance between it and Donya's Interceptor without trouble. When it reached her, it would splatter her across the sky. She had no more solid ammunition, just her laser. She needed five minutes to reach Godard.

The missile made minute course adjustments, straining like a hunting dog. It was starting to catch atmospheric drag thanks to her low angle, but it was able to push through with brute force. As it approached the seven hundred-mile mark, Donya armed her laser systems. The rocket had already disengaged its LACE, and it was moving into final boost stage. Her only hope was to outlast its propellant. Unless . . .

"Godard, this is Foxglove, what's the word on laser support?"

"You're still out of range of the station. We can't get a track on the bogey through the atmo."

"At current speed, what's the ETA on that?"

"Two minutes."

She stared as the little missile, visible only as a dot on her screen, nuzzled closer through the void, seeking the inviting warmth of her fighter.

"That's one minute too long!"

"Well, we can't move the station. You have to try and juke it."

The missile streaked closer. Its supplies were still going strong.

Donya swore and turned her lasers to face the target. The charging diverted useful energy from her Microwave "reactionless" drive, but it was more than worth it.

The missile approached. At this angle, the curvature of the Earth meant that there was significant atmosphere even between her and it. Laser blooming was unacceptable at this range; it would be like firing a flashlight at the missile. She waited as the deadly thing grew closer, and closer . . . now under one hundred miles, now seventy, now thirty . . . ten!

She depressed the trigger. The invisible beam of the laser struck the missile right on target, and managed to stay there. The ablation from the beam knocked the metal monster nearly sideways, before finally causing the explosive inside to detonate.

A puff appeared in the black.

Donya didn't have time to sigh with relief before warning lights started flashing, alarms blared, and systems began to shut down.

Pieces of the missile shattered the main laser array, and then ripped the solar panels to shreds. Finally the main computer took a direct hit, and her vision went black.

“Just because the enemy is dead doesn’t mean you’re alive.”

Donya pulled off the headset and slammed it as gently as she could while still expressing anger against her desk. The FMRI/ HUD headset cost significantly more money than she had ever seen in her life. She slipped the haptic gloves off her hands and dropped them on top of it.

“I know what I did wrong. It’s just a sim.”

She stood up in her dorm room. It was littered with papers and digital paraphernalia, as well as healthy dose of collector’s items and memorabilia from her favorite video and AR games.

Walter Crant’s British accent emanated from the onboard speaker of her tablet. It was currently exhausting its entire processing capacity attempting to keep up an encrypted link.

“Every failure is an opportunity to improve. What you did was focus too much on the orbital reflectors. We would have lost Godard.”

“Godard can take care of itself, it’s a goddamn space station!”

“Yes! So no matter how many guns we put on it, it’s still stationary! A sitting duck! Why do you think the Interceptors even exist?”

Donya didn’t answer.

“You ready for debrief?”

She looked at the smart tattoo on her wrist. It told her it was nearly 3 p.m.

“Nope. I have a class to get to. Now since I’m a frozen corpse slowly careening through space, can I go off? I’ll be late.”

“Debrief at 8 p.m. tonight. And don’t be late. I have twenty other trainees, and they’re actually grateful for the opportunity to serve.”

“I’m grateful for the pay.”

“We both know that’s not why you’re in this, Agent Foxglove.” And without fanfare, he shut off the link.

“Prick.” Donya whispered as she put on her backpack and stepped out the door.

She walked through the hanging vines, bamboo, and succulents that made up the exterior of most every campus building. They had gone hard for the biobuilding craze, matching much of California. But it all would have been for naught without her father’s idea. Global warming had been dampened by one thing alone: the reflectors. Her father’s reflectors. That’s the only reason she got out of Iran in the war. His concept was too good to ignore. She still remembered the clammy embrace of the gas mask, watching the customs agent eye her with distrust, as if her seven-year-old self represented a grave threat to American security.

She could see her Dad’s contribution every day. The dim dots in the sky that you needed a binocular to see, but could see all the same. They were her father’s work. The solar reflectors gilded the planet in a protective wrap of silver mirrors, blocking a portion of the sun’s rays. They were studded with solar panels, capable of producing a significant portion of the world’s energy. They had saved the world, but not him. Farouk Al Shirazi made sure that Donya and her mother left first. But he stayed too long, and his office in Tehran crumbled under Kazakh and Pakistani bombs.

She had escaped into games. Gamers didn’t care whether you were from Iran, or America, or Timbuktu. All they really cared about was your capacity to win. Alternate reality games that made her forget the dwindling food on her table and erased the worn looks on people’s faces in the hard times after the war. She’d excelled, even among her friends, winning her first championship at sixteen. Now here she was, paying for a Stanford education with her winnings, more secure than she had ever been in her life, but she wanted more. She wanted to win, to excel. Crant gave her another chance to be the best.

The best at war. That’s pretty fucked up, isn’t it?

The funny thing was, after the stress of gaming eighteen hours a day to train for tournaments, piloting military drones in space was relatively easy. Reality was simpler than the games.

Professor Williams squinted out at the classroom, a diminutive shape compared to his taller and stronger students. His generation was horribly unhealthy by today's standards.

"When the Sovereignty movement started really taking off, they scared the hell out of the UN. Imagine it: a few million of your own citizens claiming dual citizenship to a nation that only existed on the Internet! A few governments even designated them my favorite meaningless word: terrorists. Hell, I remember when I was young, we had pundits calling them Soviets. Probably still do."

Donya turned back to her tattoo. The data feed flashed, but she didn't pay attention to what was going on. She looked back up.

He grinned and turned to the classroom. "Now, could anybody tell me what the Sovs did in response?"

Silence. Donya looked at her wrist. There was a message from Crant: *Something's wrong.*

The Professor shook his head. "Does anyone recognize the name Scalpel?"

Donya sat up straight. A few hands raised in the class. Hers did not. She tried to keep her face blank. She typed without looking: *Specifics?*

"Well, Scalpel is widely believed to be the military arm of the Sovereignities. It began to combat the increasingly antagonistic intelligence operations carried out by most world governments, foremost among them the United States and China. Like the Sovs, they span borders without a care, operating in enemy and allied territory alike."

She wondered what Professor Williams would think if he knew a Scalpel agent was in his class right now.

Crant messaged her again: *Check the feed.*

She tapped one of the sensors and switched to her data feed. It took her a moment to understand what she saw.

When she did understand, she felt fear ooze through her like water from a deep sea current.

Williams continued obliviously. "Scalpel was known for recruiting young technophiles. Donya, have you ever considered joining up?"

Donya looked up. The Professor was smiling sardonically.

"Considering how much more interested you are in whatever device you have there than my class, I imagine you'd be a perfect fit. Maybe you can enlighten us as to what Scalpel's first major combat action was?"

Donya stared at the teacher, and then at the other students in class. None of them knew. Nobody knew but her. She looked up at Williams.

"The Water War. ICBM takedowns, right?"

"Well, it seems that you at least do the reading before class. Yes, Scalpel found a cheap solution to missile defense: they flew commercial drones packed with explosives into the silos as they opened, detonating the boosters on site. It was so cheap people almost didn't believe it was possible. These kind of absurdly low cost and inventive techniques defined Scalpel's combat up to today . . ."

Donya was already looking back at her tattoo. A massive stream of data was piling up. At its head:

NUCLEAR WEAPONS SUSPECTED IN ANNIHILATION OF LAGOS.

She got up and pulled her backpack on. She stepped out of class.

"Excuse me, Donya, where are you going?"

Donya didn't answer, and flipped down her visor.

"News query, Lagos." She barely vocalized, the throat mike picked everything up easily.

The images made her stop walking. That same oblong plume of smoke she recognized all too well. Fires and blackened earth, grainy footage of blackened people.

"Call a certain surgical instrument." She whispered. A blank Unicode number appeared on her visor. A moment later, she was speaking with Scalpel Agent Walter Crant.

“It wasn’t a nuke.” He said it before she’d even opened her mouth.

“What else does *that*?”

“Just moments before the impact, we pinged an inbound target. From space.”

“Jesus. You—you can’t expect me to believe that ET—”

“It was one of ours. The UN’s more specifically. The UN space probe Zheng He, sent out in the sixties to investigate Centauri.”

“What the hell is it doing insystem?”

“Better question, what the hell was it doing accelerating toward Lagos at .7 light speed?”

It dawned on Donya then. “Shit. They didn’t need a nuke.”

“No nukes about it. It had a reactor and a Microdrive to accelerate it as long as it wanted; the brute force was enough to cause the explosion. Somebody hacked its controls, probably back when it was being built, so that it would make a U-turn in interstellar space and accelerate continuously until it reached us.”

“Why? Who the fuck wants to create a city buster that would only work in forty years?”

“Doesn’t matter. Consider yourself deployed.”

“I thought you had plenty of pilots!”

“We lost—” the call cut out. At nearly the same moment, the entire city went dark as well. Only the bioluminescent fungi on the walkways stayed active. Donya’s HUD disappeared, and she felt a burning in her arm. Her tattoo was dead. She looked up.

“Shit!”

A blot of light in the sky, too wide and faint to be a star or a planet, was slowly fading into nothing. The high altitude nuclear airburst dissipated quickly, until there was nothing there at all. It made no sound. However, the sound of a commercial jet careening out of control lent its cacophony to the event. Donya turned and watched the black manta ray shape of the plane twirl down through the clouds, only to dash itself against the far off city in a dim flash of orange.

“Oh . . . fuck!”

Donya ran.

She slammed open her door and ran to her desk, dropping her backpack next to it. She slid her gloves on immediately and fired up the interface. All her other gear was fried by the EMP but Scalpel had made sure that her mission integral equipment was hardened.

She typed rapidly with her haptic gloves, and then spoke: “Scalpel asset designate Foxglove on station, ready for operation.”

There was a pause, longer than any she had dealt with in training. Finally, her vision went black, and she saw Earth. It did not look the same as she remembered. An ugly cloud emanated from Nigeria. Flashes of light in low orbit marred the skies of the blue marble, and clouds of new debris cluttered the commercial orbits. Her fMRI headset effectively read her mind, and zoomed in on any computer-designated objects or debris that she focused on while simultaneously auto-targeting weapons to the contact. Crant’s voice interrupted her horrified study of the carnage.

“Foxglove?”

“Yes?”

“I’m giving you full operational control. They’re going after the reflectors.”

“Why?!”

“It’s the Africans, among others. They’re worried the mirrors could be used as an energy weapon. They’re deploying forces as we speak!”

“What about Godard?”

She heard Crant take a breath on the other end.

“Godard station was deorbited by a nuclear shaped charge. That’s why we need you to pilot. Good luck.”

She was already in orbit above the lion’s share of the reflector array, using its light to gather up a wealth of solar energy in the Interceptor’s batteries. She was glad that despite the chaos below it, the array seemed to be almost entirely intact. The Interceptor chassis carried both radioisotope generators and conventional batteries, as well as a small forest of solar panels that could be retracted in differing numbers and to different lengths. Its interior contained several microwave drives, evolutions of the proven EMdrive concept, turning electrical power straight into thrust. In addition, chemical thrusters were attached to the vehicle for speedy maneuvering. It sported a megawatt laser system with an effective range of over a hundred miles in vacuum. At the center of the squat structure was a magnetic railgun, capable of firing clouds of smart pebbles, or “buckshot” as it was often called.

The object appeared on her scanners, accelerating on a fast and tight orbit towards the array. Nothing could hide from her in space, least of all this. The distinctive scaffolding-clad form of the African Confederation’s primary space weapons platform, the *Remora*, became immediately evident.

Donya sent it a prepackaged deterrence message. There was no use trying to hide. They could see her just as well as she could see them.

The ship continued without responding. She sent the message again. That was when her cameras flashed.

Dazzlers!

The enemy was firing their lasers at her. At this range they wouldn’t have a chance of burning her ship, let alone causing explosive ablation, but they could still render her blind.

She fired her cluster round. The recoil blasted her away from Earth at nearly two hundred miles per hour. The enemy laser immediately ceased dazzling her and aimed at her round. She fired up her Microdrive to begin a slow approach to the reflectors, intending to head them off. They wouldn’t get a chance to harm her Dad’s work. Her shot hit the *Remora* a moment after she began maneuvering. Between laser point defense and a quick maneuver, the ship had avoided most of the buckshot, but something must have struck it because it began to spin like a top.

She was so focused on the enemy craft that it was only when the computer notified her that she became aware of a series of contacts coming fast on an opposing orbit. She focused her rear cameras. It was a number of objects, but this was no high-altitude cloud of debris. They were in formation, and they were emitting energy. The profile was unlike anything she’d seen before. She figured, given its size and complexity, that it was likely American. She just hoped they hadn’t caught on to the fact that reflectors could be used as a weapon too. She couldn’t fight a two front war in the damned thing.

She didn’t have time to consider the implications of this before the *Remora* fired three Tsetse 7 missiles. Donya didn’t think. She acted. While the missiles were still close together, she fired another round of buckshot. It took a moment for the round to connect, but she was rewarded with the blast of two missiles detonated. The *Remora* was damaged by some of the debris. Pieces of the craft hung limply from its core like the flayed skin of an animal.

The third missile continued toward her. Donya pivoted her ship on thrusters and fired her laser as it cleared the fifty-mile mark. She learned her lesson from the sim, and this time jetted away from Earth in a radial outburst just as her laser struck and fused the missile’s end. The cloud of lethal debris passed “under” her Interceptor.

The *Remora* was now only a few hundred miles away, and it was engaging in periodic burns every few seconds, coming closer and adjusting course minutely in an attempt to stay unpredictable. It fired another salvo of missiles, two this time. Donya loosed more buckshot at the *Remora*, hoping to put the beast out of commission for good. This time the rounds had good effect, and they tore gaping holes in the superstructure of the craft. She saw a telltale blast of one of its missiles detonating. She smiled, until she noticed something.

She enhanced the view on her headset. Air. Streaming from the *Remora*. And in that rapidly dissipating air . . . moving shapes.

The *Remora* had a five-man crew. Donya stared through the cold glass cameras, and watched the bodies stop moving and begin to cool. Only then did she turn back to the American drones. She swiveled the laser mount around. The little octagonal frames showed the telltale flashes of radiation from their microdrives. She saw no weapon systems. But then she saw the computer calculate their trajectories.

“No! No fuck you!” The little machines were forming up so that they would all impact the solar reflectors.

She initiated a burn in a vain attempt to close in on the drones before they hit the reflectors. She launched buckshot into the swarm. The round smashed dozens of the enemy, but the swarm reformed faster and more efficiently than a human formation. They were fast approaching the reflectors, and her. She activated the laser. It reached each of the drones and fired. Drone after drone became inactive, but the swarm stayed largely intact. Finally her heat sinks were overloaded. She vainly tried to maneuver out of the way with Microdrive but the smaller, nimbler drones outmatched her. Two drones approached at thirty-four thousand MPH. She braced herself to see the screen go blank.

Instead, it went silver.

Donya made an animal noise as she watched one of the mirrors use its onboard microdrives to maneuver on front of her. The drones smashed into it, but even at their insane speeds, the hyperdense polymers and the self-assembling semiorganic compounds that made up the back of the mirror slowed them down significantly blasting them off course. The jagged splinters of mirror and drone sheared off several of her solar panels, but didn't strike the center of her vehicle. She was safe.

She sat, watching infinities of stars reflected in shards of the reflector.

“Foxglove, Foxglove are you there!”

“Was that you? Did you fucking destroy it!?”

“Yes, of course! We hacked the controls of the reflector. We needed to protect your vehicle. It's a high value asset.”

“You fuckers!!”

Crant yelled over the speaker, shocking her into opening her eyes. “Listen, Foxglove, disengage right now!”

“Why did you do it? You needed to save a goddamn weapons platform instead of the most important fucking—!”

“We have an inbound track on a missile.”

“There's nothing on scanners you idiot!”

“Not in orbit! A hypersonic missile is inbound to your position. *On Earth*. Get the fuck out of there!”

For a moment it seemed like he was speaking a different language. Then it sunk in.

She ripped the headset off and ran. She blew out of her dorm and sprinted for the nearest fire alarm. Thankfully, the fire alarm at least was EMP hardened.

She was yelling at people streaming out of the stairwells to run when the blast knocked her on her feet. She managed to get up, and felt the blood on her face. She touched her hair. Nothing lethal. When she opened her eyes, she realized the same couldn't be said for everybody. It was a maelstrom of smoke and fire. The missile had streaked in and hit somewhere around the third floor, where she lived. She ran past people moaning on the ground, towards the smoking maw of the stairwell.

She tried to push her way into the heat and smoke, but a hand grabbed her arm, holding her back. She pulled, but the hand did not give. She turned to stare at Professor Williams.

“You can't go in there! Wait for the firefighters!”

She pulled again. “Get off me! Get off!”

“It's too dangerous!”

“I did this!” Williams let go, his mouth half open.

“I did this,” Donya repeated. “It's my fault. So I have to try and fix it.”

She ran in. But the smoke burned in her throat and the heat was suffocating. She didn't know when she collapsed, but she did remember the cool embrace of a hardened firefighting bot pulling her from the building. She remembered seeing the sky above as she was carried out, and how it was full of shooting stars. She remembered the bot taking her not to the firefighting trucks, but to a white van, piloted by a gaunt man in a suit with a sallow, angular face.

“It's okay Foxglove. You're safe now,” Walter Crant said.

Donya was piloting the Interceptor again later that night. They needed somebody on picket duty at all times. The solar cells

were already repairing themselves, and disposable rockets from Scalpel's stocks on the Moon would rendezvous with her vehicle in twenty minutes to supply her more buckshot.

"You did a good thing today," Crant said.

Donya made a minute course adjustment with a wave of her glove. The air in the safehouse smelled vaguely of plaster. Homeland Security was no doubt after her, but Scalpel could keep her safe. Her mother was probably terrified.

"That interceptor is the last weapon left in space. Scalpel has orbital superiority. Something the Africans and the Americans can't say for themselves."

Donya stared at the stream of shining metal and glass as it flowed beneath her, like a silver river around the Earth, encircling it and keeping it safe.

"I always assumed you were in the UK."

Crant chuckled. "That's the beauty of Sovs. You never know who's around the corner, willing to give you a hand."

"Whether you want it or not."

Crant sighed. He waited, thinking, before responding:

"Your father's work wasn't in vain. We can rebuild it. But first we need to win what looks like a fourth world war. Priorities, you know. It's all about value."

Donya nodded. "Priorities. Dad understood that. It's funny, because he was near the top of everyone else's list, except his own."

"I imagine those two facts are connected. I think your father would have worked with us, if the Sovs had been around then. We just want what's best for everyone."

Donya watched the cold, cold stars, and she wondered how long it would take for the crew of the *Remora* to fall back home again.

"They all say that."



Article I, Section 8, Clause 11

by Ken Liu



"The Chinese are stealing all of our secrets," said Mrs. Lillian St. Lucia Gray. "That's what the *Times* says."

"What are you doing about the Russian hackers?" demanded Mrs. Amelia Day. "You must be doing *something*?"

Thankfully, the phone buzzed in his pocket. Senator John J. Andersen extricated himself from the conversation with two Daughters of the American Revolution—also two of his mother's dearest friends—and hit the "Answer" button.

"They've done it," said Mark Zweir, the Senator's Senior Aide.

The Senator swore under his breath. "Give me a second, Mark."

The summer evening was warm and the air smelled like the sea. For his mother's ninety-fifth birthday, the Senator had rented the seaside Carrington Mansion in New Wexford, Connecticut. Built in the early 1920s, right before the Great Depression, the Renaissance Revival palace was a monument to a time when the powerful saw flaunting their power as a part of their civic duty, most notably manifested here with a terrace filled with marble statues shipped from Italy overlooking the surf of Long Island Sound.

It was now part of a state park, and the grounds were landscaped by volunteers from the local historical society. The place

looked impressive, which was important for his mother; offered plenty of space for the guests to mingle and break into small conversational groups, which was important for conducting business; and included seventeen bathrooms, which was an important fact now that he needed to get away from prying ears.

Senator Andersen pulled the door of the tiny bathroom shut behind him.

“I thought everyone agreed to make no moves to change the political status of Donetsk and Luhansk for at least ten years,” the Senator said. He could feel tension spreading in his gut. He stuck his neck out backing the President on the deal that was supposed to end the conflict in Ukraine, and that deal was going belly-up.

“Well, I guess someone has decided that the terms of the deal need to be revised.” Mark Zweir’s voice was, as always, imperturbable. Andersen appreciated that about his Senior Aide; politics was like poker, an art that required the utter purging of emotional displays, something Zweir excelled at during his meteoric rise on the Hill after graduating from Harvard Law. “They’re announcing in the morning that a referendum will be held next month for the two breakaway republics to join Russia.”

“And of course the referendum will pass,” noted Andersen dully. “The Russians will welcome them with open arms.”

“And back them up with tanks and fighter jets,” said Mark, “an arguably more important point.”

“Those clowns in Kyiv have been doing nothing but bickering and jostling for position since the cease-fire,” complained Andersen. “Maybe they could have bought off a few rebel leaders if they had used the time wisely, but instead they just let the Russians sink their claws in deeper.”

“Democracy is hard,” observed Mark.

“And venal,” Andersen muttered. “With friends like these . . . Any way I can spin this to my advantage?”

He looked through the one tiny window in the bathroom. It was getting dark, and citronella torches flickered over the wide expanse of the lawn and the distant beach. His grandson James was sitting under one of the torches with his laptop, and a cluster of his friends were gathered around him, bantering as they gazed intently at the screen. *How old is James? A sophomore in high school? A junior?* He tried to remember.

“Not easily,” Mark said. “The President is going to be blamed for appeasement, and you won’t look much better for having backed the deal. With the election just eighteen months away, you can be sure your opponents will make the most of this as you declare your candidacy.”

Andersen rubbed the bridge of his nose. His stomach was feeling queasy. The trouble with foreign policy was that foreigners were so unpredictable.

James’s friends let out a loud cheer. One of the girls, a pretty blonde, leaned in and whispered something in James’s ear, and James looked pleased as he tapped away on his laptop. Andersen marveled at the sight. It was hard to believe that messing around on a computer could impress girls. How times changed.

Mark’s calm voice continued, “That’s not all. The Burmese air force lobbed another bomb into China earlier today from Kokang, killing twenty people. Weibo—that’s the Chinese microblogging service—is blowing up with outrage even as the censors are working overtime.”

“Didn’t we tell the Burmese to knock it off?” Andersen asked. He struggled to remember what this civil war in that remote corner of Southeast Asia was about. Something about an ethnic Han enclave trying to separate from Myanmar: atrocities, child soldiers, a border arbitrarily drawn on a map that didn’t match how people lived—the usual sort of mess left by the British in their colonies. A mess that Americans have to clean up.

“We did. But this is the third time this year they’ve let their little civil war spill into China. I don’t think the Chinese can afford to not respond after so many of their people died. Even they can’t ignore public opinion on something like this. Beijing might just decide it’s finally time to march into Kokang.”

“And I just pushed the President into agreeing to increase military aid to the Burmese army.” A headache was starting to throb behind Senator Andersen’s eyes.

“The Burmese generals might have interpreted that as a sign that we’d back them in a dispute.”

“Idiots!” the Senator fumed. He closed his eyes and envisioned the faces of shouting reporters. “The President has no

appetite for another conflict. But if we don't back our so-called friends, everybody will squawk that we're not standing up to Russia and China."

"No matter what the President does, you have to take a hardline for the election," said Mark. "Polls consistently say that voters are concerned you never served in the military."

"How hard a stance do you think I should take?"

"How hard do you want to win the election?"

Andersen sighed and tried to massage the back of his neck. "Starting an actual war with either Russia or China is politically untenable."

"Maybe," said Mark. "I've seen conflicting models for how voters will react to another big war. It depends on how it's sold."

"This isn't like revenge for terrorism," insisted Andersen. "Body bags being flown back for some sliver of jungle in Asia or a plot of Eastern European farmland nobody's ever heard of will not make me popular in eighteen months."

The headache intensified behind his eyelids. He looked outside the window again, and James's friends were taking turns shouting out something for him to type into the computer and falling all over each other with laughter.

"You might also open yourself up to charges of being a chickenhawk," conceded Mark.

Andersen struggled to keep anger out of his voice. Mark was just doing his job. "What if we impose heavy sanctions? Crippling ones?"

"That's not likely to do much. The last round of sanctions on Russia hasn't even been lifted, and you can see how much effect they are *not* having. With the Chinese it's even worse—their economy is so entwined with ours that sanctions will make Wall Street howl, and your average voter is going to see prices for everything go up."

"We need some other way of fighting a war," muttered Andersen. "Like . . . superheroes who can go in there and squeeze the necks of the head honchos in Russia and China and get them to stop without risking the lives of our soldiers."

"Senator—" Mark's voice hesitated and then stopped.

"What?"

"With all due respect, that's the sort of thing that makes you come across as soft—"

"I know that! I'm not going to say anything like that in front of a reporter!"

"It's best to get into the habit of not saying anything like that at all. These days, anything could be listening and recording: smartphones, home automation systems, cars—"

"Okay, point taken. Let me think more about what to do, and I'll talk to you in the morning."

Senator Andersen hung up and splashed some cold water on his face from the sink, trying to make himself feel better. He had staked his presidential hopes on the big foreign policy initiatives he proposed to the President. Having them turn into bloody wars was the worst possible outcome.

If only there were some way to strike at the Russians and Chinese without risk.

He knew that he was the right person for the presidency. No one else had the vision to make the tough decisions to make the country great again, to focus on science and education, and *making* things and move the country forward against entrenched special interests who just wanted to protect their feeding troughs. But to get to that place, he had to posture and placate the voters who understood nothing except what the talking heads on TV told them. He couldn't appear weak.

Mark's paranoia also depressed him. How was one supposed to think things through with everything around you listening in all the time?

James's mother, Ellen, had shown him a little black box they got from Centillion. It sat in the kitchen like a fancy toaster. "Tilly, tell me what's the best way to cook this?" She had then held up a horrifying, green, oblong *thing* covered in warts she got from the Vietnamese supermarket in front of the glass lens protruding from the top of the black box. "Tilly" had then proceeded to identify the vegetable as bitter melon and recited a recipe.

Creepy.

While his mother's friends thought there was a Russian or Chinese hacker hiding behind every email, while he couldn't see the point of living your life surrounded by robots, the digital world was not only taking over everything here in America, but also over in Europe and Asia, and it was a world in which kids like James felt at home. Young men and women not much older than him were starting billion-dollar companies based on tapping on keyboards to cast digital spells.

The armed forces had good hackers, Senator Andersen knew. But they were focused on fighting a cyberwar in support of a real one: crashing power grids, knocking out communications systems, disabling banking networks. They were like nuclear weapons or aircraft battlegroups—too heavy-handed to use in situations where you didn't really want to start a shooting war.

What he needed was something much less . . . war-like. Something cheap and effective.

In the flickering torchlight, Andersen saw James perform some other heroic deed in the digital realm, and his friends clapped him on the back and cheered.

Just because you don't know how something works doesn't mean you can't make use of it.

Senator Andersen took out his phone and started to tap out a message.

#

"Don't keep it on a computer if you really want to be safe," said Lang as he tapped away on his own laptop.

"So you really believe I should keep the bitcoin wallet on paper?" asked James. "That just seems so paranoid."

Lang brushed his long, black hair out of his eyes and shrugged. "If you don't want to be hacked, that's the only way to be sure. But it's your poker winnings, so do whatever you want."

"I always listen to you; you know that." James had always respected his friend's technical opinions; Lang had been running his own ISP in Taiwan since he was eleven.

Lang had come over to James's house to finish up their joint social studies project. They were writing about the latest student protest movement in Taiwan, in which Lang had participated earlier in the year.

"I'm almost done writing up the section about what we did on ShareAll," said James. "Do you want to review it?"

"Nah. You write better than me. Just don't mention the bot accounts we created," said Lang.

"Obviously."

"But you did talk about organizing to get the mainland accounts banned, didn't you?" asked Lang.

"Briefly. I described those accounts as propagandists and left it at that."

"Good. I still think we should have hacked into ShareAll's systems and blocked all Chinese users."

"You don't really mean that."

"Yeah, too flamboyant and risky."

"Are you going back to Taiwan again in the fall?" asked James.

"Maybe," said Lang. "But I don't know if we'll have better luck this time. The people in charge are too tied up with business interests on the mainland; they wouldn't dare to call for a referendum on independence even if we got better participation rates than last time. Even a fight for freedom always comes down to money."

Loud music blared from the speakers of James's laptop.

"What are you watching?" asked Lang.

"It's a link my mom sent," said James. "My grandfather's on TV."

"Make some space," said Lang. He set down his laptop and moved to sit next to James on the floor, who tilted the laptop screen so that they could both see.

The *Cross-Talk* logo in red, white, and blue swept onto the screen and then off, revealing the host, Amy Rowe.

Rowe: Welcome to Cross-Talk, the only show where tough questions get real answers. Joining us today is Senator John

J. Andersen, who has just proposed a controversial law to authorize civilians to “hack” on behalf of the United States. Senator, thanks for agreeing to be here. Can you explain what your law does?

Andersen: Thank you, Amy. The Helping American Computing Knowledge and Networks Evade Exposure & React Act—

Rowe: That’s “Hackaneer,” right?

“Some intern probably spent days coming up with that,” said James. “This is probably pointless. Want to go back to the report?”

“Let’s watch a little more,” said Lang.

Andersen: . . . allows individual Americans and companies to retaliate against foreign hackers who breach their systems and immunizes their actions from US and international anti-hacking statutes.

Rowe: Aren’t you essentially legalizing vigilantism and “street justice”?

Andersen: The fact is, Amy, we live in a dangerous world, and our adversaries treat the Internet as a lawless sea. The Russians and the Chinese, besides their state-sponsored hacking units, also encourage their citizens to act essentially as state-sponsored pirates to steal valuable American intellectual property as well as national security intelligence. When our adversaries are pirates, we can’t let our people go out there unarmed.

“That’s wild,” said James. “Can you imagine if the guys at Centillion started hacking back against the Chinese?”

Lang was gazing at the screen intently and didn’t answer.

Andersen: . . . protect American ingenuity and entrepreneurship in the most traditional and American way: empowering our people to defend themselves. In the days when the high seas were as lawless as the Internet now, nations would issue letters of marque so that private citizens could fight for their sovereigns. Our Constitution gives Congress authority to issue such letters under Article I, Section 8, Clause 11, and it’s high time we used that power . . .

“The FBI isn’t going to like that,” said James.

“Why?” asked Lang.

“He’s basically saying that our own government hackers are too stupid to do their jobs, and the geniuses at Centillion and ShareAll have to pick up the slack for them.”

“I don’t know about that,” said Lang. “I think your grandfather has something bigger in mind.”

Andersen: . . . the best defense is, as we all know, an offense. Rather than waiting for pirates to attack, we can make their key supporters feel the pain.

Rowe: How would you limit these cyberspace “raids” though? International law experts are certainly alarmed.

Andersen: We have a system that will prevent abuses. Letters of marque granting immunity from prosecution will only be issued to companies and individuals who register with the government and undergo training to understand which targets are permissible. We won’t allow lives to be put at risk or harm critical infrastructure; rather, the emphasis will be on economically valuable targets tied to the political elite—prize ships, if you will.

Rowe: But why resort to bounty-hunting and prize-taking? Legal experts are dubious about your justifications and say that we should stick to prosecuting the foreign hackers in courts.

Andersen: Amy, one thing I’ve learned is that if you listen to lawyers you never get anything done. International law is made by people doing things, not sitting around wringing their hands.

Rowe: But the methods you advocate here are potentially just as troubling—

Andersen: We’re already at war, Amy. It’s just that the war is limited and fought with computers and brains instead of missiles and soldiers on the ground. I’m not going to second-guess how the hackaneers want to accomplish their objectives. Sometimes it’s best to leave the war in the lawless sea to those who know the sea best.

“Damn,” said James. “He’s not just talking about hacking back. He’s going to authorize privateers.”

“What are privateers?” asked Lang.

“They were basically legal pirates. We studied them last semester, remember? If you get a letter of marque from a king, you could seize merchant ships from other countries as prizes, and you wouldn’t be considered a pirate.”

Lang nodded, thoughtful.

Andersen: . . . because as the late Steve Jobs said, “Why join the navy if you can be a pirate?” There are some who would never submit to the discipline of government and military service, but who would gladly serve their country for profit and patriotism if allowed to do things their own way.

#

Of all the realms where mankind has ever waged war—land, sea, air, space—cyberspace is perhaps the most confounding.

Constructed out of layers of abstractions—symbols, encryption algorithms, software protocols, bits and bytes, pulses of electricity and light—running on geographically distributed servers, databases, and network connections, cyberspace is simultaneously lawless and minutely regulated, an unexplored frontier as well as a collection of corporate-feudal states. Every transaction potentially takes place on multiple nodes across the globe, utilizing hundreds of sophisticated mathematical algorithms executed by hardware owned by a dozen companies and states.

It’s a jurisdictional mess, full of openings for the just and the unjust alike. There is no domain more chaotic, more dominated by the fog of war. Every action can be attributed to a false flag, every layer of indirection enhanced with another.

But it is also a realm of magic. With flash mobs and slave nodes and zero-cost copying, cyberspace is also a realm where an individual’s powers can be enhanced and multiplied until it is indistinguishable from the most powerful state in the history of the world.

And as more of our systems become digitized, cyberspace encroaches upon our lives more deeply every day. Our bank accounts, our investments, our most intimate thoughts and feelings have become bits, subject to the ever-changing rules of this vast mathematical fantasy.

#

Senator Andersen glanced through the list of news headlines Mark Zweir selected for his attention.

- Chinese Authorities Halt Trading of Thirteen Stocks on Suspicion of Hacking and Manipulation
- Russian Tycoon with Government Ties Abruptly Leaves European Trade Conference without Explanation
- Activity on Major Bitcoin “Tumblers” Increased by More than Two Hundred Fold in Last Week; Experts Attribute Burst to “Hackaneers” Laundering Loot
- Centillion Thwarted Multiple Cyberattacks over the Weekend and Assumed Control of Key Chinese Certificate Authority Servers for Hours
- Chinese Foreign Ministry Denounces American “Hackaneers”; Secretary of State Asserts Right to Self-Defense
- Russian President Backs Off from Threat to Prohibit ShareAll from Operating in Country

“What happened with ShareAll?” the senator asked.

“Who knows?” Mark shrugged. “ShareAll pissed the Russians off by hosting ‘I Stand with Ukraine Day.’ But the company was prepared to be banned because they were sick of getting hacked by the Russians anyway. I suspect that the Russians ultimately backed down because they find having ShareAll in the country useful.”

“How?”

Mark looked at the Senator. “If they have a backchannel into the ShareAll data centers in Russia, it’s a great way to keep tabs on the dissidents and foreign journalists who rely on ShareAll.”

“Ah,” said Andersen. “Of course.”

“I’ll discretely remind the ShareAll people to isolate their Russian employees from the rest of the company the way Centillion did with their Chinese office,” said Mark. “You can’t trust any of them.”

“The Russians seem generally more reasonable these days,” said the Senator. “They’ve not moved to annex either of the breakaway republics.”

“When the Russian President’s best friends are losing their overseas investments to hackaneers, they tend to let him know what’s on their minds,” said Mark.

“It’s a problem with crony capitalism,” said Andersen.

“I consider it a feature, not a bug, for our purposes. The most obvious business targets for the hackaneers are also the ones with the most influence on policy. Informally, I’ve heard that the hackaneers stole basically all the savings of the Gazprom management committee and their families.”

“They’re probably camped out in the Kremlin advocating for us,” said the Senator. He chuckled at the imagined scene.

“And not a single shot had to be fired,” said Mark, a rare note of admiration in his voice.

“Nor did we have to resort to blunt sanctions that hurt the average person far more than the criminals in charge,” said the Senator.

“The Chinese are backing off too. Turns out that the families of several members of the Politburo had converted large portions of their graft-begotten fortunes into bitcoin, which now no longer belong to them.”

“What’s bitcoin?”

“It’s basically virtual cash—easy to steal and even easier to launder by the hackaneers. Says something about the faith of these princelings in their own government and currency that they wouldn’t even hold all their loot in renminbi, doesn’t it? Anyway, the Chinese are pulling out of Kokang, though they’re claiming that it’s voluntary because they’ve taught the Burmese a lesson.”

“I certainly hope the Burmese *have* learned a lesson,” said the Senator. “I’ve got to make sure they understand that if they mess up again, they’re on their own. What else?”

“Both the Russians and the Chinese have expressed some interest in talking about a formal treaty regulating state-authorized civilian hacking.”

“A convention to outlaw hackaneering?” Senator Andersen laughed and shook his head. “We should have issued letters of marque years ago. There’s no deterrence until the cowards over there see what we can do. No matter how many state-sponsored hackers they hire and train, they just can’t match our numbers and skill when we call out the volunteers in Silicon Valley. That’s the real benefit of freedom.”

“I’ll draft up some talking points for you to take to the Secretary of State,” said Mark.

“Anything else?”

“The President is very pleased with the way the Hackaneer Act worked out. He’ll certainly campaign for you as hard as he can.”

“Good, good.” Senator Andersen began to pack up.

“When do you want to call off the hackaneers?”

“Monday,” Andersen said. He was planning for a weekend of well deserved rest and relaxation. “Let the kids have another few days of fun. Whatever loot they accumulate will be good for our economy. Oh, do remember to tell Treasury to work on regulations on how this loot will be taxed. The American people deserve their cut.”

“You might also want to tie up some loose ends,” said Mark. “Some of the hackaneers, I understand, resorted to blackmail and extortion to get their loot. You’ll have to decide if we really want to grant blanket immunity. And quite a few lost their loot when their crew stole from them.”

“There’s no honor among thieves, I suppose.” The Senator shrugged. “But they got the job done.”

#

A few months later:

The sudden surge of Soong Ming-chih has taken the Kuomintang and the DPP alike by surprise. Over a period of merely three weeks, her once-moribund independent campaign to be the President of Taiwan has been revived, and most polls show her gaining more than thirty points. Political analysts credit a sudden infusion of campaign funding as well as the effective

use of online media.

Soong has promised to call for a referendum on the status of Taiwan as soon as she is elected. Reaction from the mainland has been surprisingly muted. The Chinese Foreign Ministry has refused to answer questions about the election in Taiwan, and posts mentioning Soong's name are deleted from social media almost immediately . . .

Senator Andersen muted the TV and spoke into the phone.

“Do we know where she’s getting the cash?” he asked.

“No one knows,” said Mark. “The State Department speculates that it’s from overseas. All the intelligence agencies are working on it once they figured out that the money didn’t come from us or Japan.”

“The Chinese are going to blame this on us no matter what,” said Andersen. “Doesn’t this Soong understand what it means? Taiwan isn’t Kokang. If Taiwan really declares independence, China *will* go to war. The oligarchs in Beijing have staked their legitimacy on keeping that island. If they let Taiwan go, they’ll be toppled by a revolution. No hackaneers will stop them; heck, not even nukes.”

“And we’ll have no choice either, except going to war. This is a thousand times worse than Ukraine.”

The sudden spike of headache made Andersen grimace. He envisioned the dead bodies piling up on TV. *That goddamned island is going to start World War Three.* “There’s no way to stop her?”

“The woman was a political prisoner for thirty years under the Kuomintang,” said Mark. “I doubt she’s afraid of anything now.”

“What are we going to do?” muttered Senator Andersen. “What are we going to do?”

“Not a whole lot,” Mark said. “We can’t intimidate Soong and we can’t buy her off. She’s an idealist.”

“The most dangerous kind.”

“You might as well seize the initiative and start backing Soong,” said Mark. “If we have to go to war with China over Taiwan, you should try to look decisive and lead the bandwagon rather than jumping on it later.”

Andersen sighed. “All right. If we can’t stop it, spin it.”

He put the phone down, and his eyes fell on a picture of his daughter Ellen, and her son, James.

James was wearing a shirt that said “Free Taiwan.”

Maybe James knows some photogenic kids from Taiwan I can invite to campaign events. If war is inevitable, I better make sure I look as good as possible.

He picked up the phone again.

#

Lang was soaked in sweat.

Fall in Taipei was humid and hot, made more so because he was marching in the middle of such a dense crowd.

“Free Taiwan! Free Taiwan!” they shouted. “Soong Ming-chih for President!”

Their disparate voices merged into a single torrent in which they were immersed. The sense of belonging to something greater than the individual was intoxicating. Some of those marching cried, overwhelmed by the power that coursed through them.

This is what freedom feels like, thought Lang. For too long this island had been treated as a mere pawn in the Great Game among the great powers: first the Dutch, then the Japanese, and now the Chinese and Americans. Like so many other regions of the world since the days of Thucydides, their fates were not determined by the people who lived there but by politicians in distant, foreign capitals. Both America and China had wanted Taiwan to remain in this limbo state, neither here nor there, not fully free, all in the service of the balance of power, for the benefit of those who profited from the status quo.

But no more.

Sure, the money had helped. The money bought the ads and enticed the lazy and the wishy-washy to come out and paid for

the celebrities and shot the viral videos and wrote the bot scripts that posted the videos and pictures everywhere and shipped in the expensive political consultants and flew in the activist advisers and swelled the crowd.

The money also bought the tents the students slept in and supported the striking workers and rented the speaker trucks and scared those with money tied up in factories on the mainland into silence.

Democracy was ugly and messy and corrupted by money; of course it was. That had been true since the days of ancient Athens. But the money, like digital technology, was just a force multiplier. All it did was magnify what was already in the hearts of the people, freed them to speak their inchoate will. Money could nourish the seed of freedom but could not create it.

The hackaneers, like the captains of pirate crews, had needed skilled men and women, and someone like Lang was in short supply. He had told his hackaneer captain which family members of the Chinese Politburo to target, to steal the pictures of their mistresses and investment records, to rob and blackmail and extort until the crew's coffers had swelled with loot.

Then he had turned on his crewmates and stolen the money for the cause. He had been smart enough to hide behind layers of identity-obscuring accounts, to infiltrate and steal from captain after captain, crew after crew.

And there was poetic justice to using Chinese funds obtained by corruption to secure the freedom of Taiwan, wasn't there?

Between a man motivated by profit and one motivated by a cause, the one motivated by a cause was always going to work harder and fight dirtier.

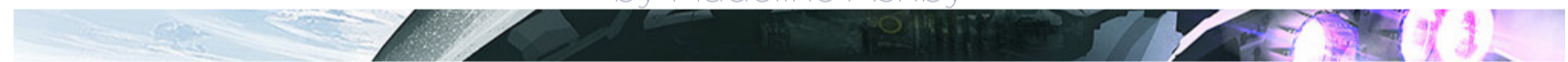
Soong Ming-chih did not understand where the money had come from, and neither did the great powers fully understand the chain of events that would lead them to war over this island. But that was the best thing about this new world: an individual, any individual, could be the equal of the great powers.

"Free Taiwan!" he shouted along with the crowd, and they marched through the streets of Taipei toward the future, one step at a time.



A Stopped Clock

by Madeline Ashby



"They don't go out to drink anymore," Jun-seo said. "They get everything delivered these days. That's the problem."

"They're all dieting," Ha-eun said. "They won't eat rice. Rice!"

"I could check the flows," Jun-seo offered.

Ha-eun shook her head. "It's a trap. Remember when I tried to unsubscribe? They still owe me money. Besides, the prediction was never that good anyway."

"But we'd know where the kids are going," Jun-seo said. "We'd see them on the maps. Their pings. From their watches."

Again, she shook her head. The flows were valuable, in theory, but, in practice, they never tended to have the information a food vendor really needed. Sure, they were great for seeing things like traffic density, like how many people were taking what train at what time, and what train might be best for getting home at what time of night, but to get granular data with actual demographic information, that cost too much.

"They're not going anywhere," she said. "They're just going online."

The two of them sipped from thready cups of coffee. Jun-seo had a 2-for-1 print credit back when the machine first unshuttered itself. It would be better, he said, than taking the monthly penalty on getting coffee in cans or pouches from the other machines. They all saw you, these days. Saw you and judged you, rolling their machine eyes like mountain aunties, then reaching into your pocket to punish you for buying things that eventually became trash. Ha-eun ran her tongue over the cup's rough lip. It felt like kissing a cat. Soon, she would be able to bite through the cup itself. Had it really been that long?

Had they really worked this same corner for all that time?

“Maybe if we sold waffles,” Jun-seo said. “Waffles are still going strong.”

“You can’t sell ice cream in winter.”

Jun-seo flinched, but said nothing. Ha-eun felt sorry immediately, but had no idea how to apologize. She opened her mouth to say something nice about the coffee instead, but as she did, the building across the street blinked out.

“Eh?” She reached out and tapped Jun-seo. “Oi. Look.”

“I see it.” He scowled. “They’re not supposed to do that.”

Ha-eun checked her watch. No alerts. No warnings about bad weather or a brownout. Across the street, the solar louvers fluttered back to factory default. Their creaks and snaps carried clearly through the crisp winter air. The building, all sixty or so stories, stood out black against the city lights like a massive door into darkness itself. For a moment Ha-eun had the terrible thought that something might actually come out of that door. Some awful titan from legend curling its fingers around the biocrete, or a dragon swimming out of the sudden shadow. She blinked hard and rubbed her eyes. Goodness, she really was getting old.

The building flickered back on. The louvers snapped back to their nighttime positions. In the awakening light, she saw a few chilly residents standing on their balconies, peering at each other. They looked around, looked up and down, and then hurried inside.

“There weren’t even emergency lights,” Jun-seo said. “In the stairwells. I didn’t see any. Did you?”

“I wouldn’t even know how to look,” Ha-eun told him. “Which ones are the stairs?”

“The narrow ones. Like arrow slits.”

“Arrow slits?”

“Like on a castle.”

She frowned. “What do you know about castles?”

He huffed and shifted weight on his feet. He jammed his hands in his pockets. “I used to like them,” he said, quietly. “As a boy.”

“All kinds of castles? Or just the kind with arrow slits?”

“Most castles have arrow slits. They’re very useful.” He sketched the shape of one in the air with his hands. His breath fogged as he spoke. “They’re narrow, see, so you can fire an arrow out, but no arrows can come in.”

“Like a gun turret?”

“Sort of. It’s the same idea, I guess. Weaponized architecture.”

They had both done the same basic training, once upon a time. During these long winter nights, it was hard to remember the interminable summer afternoons full of flies and roaches and yellow orb spiders, the absurdity of endless rifle drills. As though rifles would do any good, these days. She had been impertinent with a drill sergeant, once, about that. The sergeant made her clean the mess hall on her hands and knees. She ran the width of the hall, back and forth, pushing a vinegar-soaked rag with her fingers until her cuticles bled. She couldn’t make a fist for three days afterward.

“Jun-seo is very smart,” she said, because it was a nice thing to say after all the mean things she’d said with the added benefit of actually being true.

Jun-seo smiled to himself. “I’ll help you pack up,” he said. “It’s too cold for skinny ladies like you.”

#

The next night, the traffic lights started acting up.

From their place on the corner, through the clouds of steam rising up from Jun-seo’s bubbling pans of ddukbokki, the change seemed almost organic. Green to red and back again, like the fluttering of a moth’s wings. At first, Ha-eun wasn’t even

sure she'd seen it. But beside her, on his fold-out stool, she felt Jun-seo's posture change. He leaned forward. Scrubbed his glasses. Leaned even further forward.

"We should tell someone," Ha-eun said.

"Who would we tell?"

He had a point. She had no idea which of the city's many departments to report it to. They all had a separate terminal online—there was no single place to report something like this, whatever it was. And the proper authorities probably knew about it, already. The traffic lights were wired into everything else, weren't they? The traffic people—was there such a department?—probably knew about it before it even happened. She checked her watch. No alerts. No warnings. They were close to a big municipal data center. All the employees there had the same city badge on their wrists. She saw it when they handed her cash. Sometimes they ran experiments, at night.

"Maybe it's a test," she said.

"Maybe."

"This late, they could do one, and nobody would know. It's all rides by this time of night. And the rides know what's happening before the riders do."

Jun-seo made a sound of deep dissatisfaction. It started down in his belly and moved up to resonate in the back of his throat. Hrrrrrrrm. He usually made it for indecisive customers. Ha-eun supposed the quickly-changing traffic lights were being indecisive in their own way.

"I'm walking to the end of the block." He rose carefully to stand and pointed north. "I want to see if the lights up at the next intersection are doing the same thing."

Ha-eun did not like this plan, but couldn't quite say so. Not without sounding like a worried old woman, or worse, like someone who had no confidence in him. "Well, be back soon," she said, finally. "I can't stir my rice and your ddukbokki at the same time."

"No one's buying anyway." He re-wrapped his scarf until it covered his mouth. Somehow, she could still detect his smile through it. "And anyhow, I like mine a little burnt."

She watched him set off into the night, shoulders still loose and not hunched like an old man's, his figure shrinking against the tall edifices. She should have warned him about ice. Given him her umbrella. Not that there was an ice warning tonight, but it was always a danger. It accumulated high up on the buildings during the winter, getting heavier and heavier, until it could no longer cling to the balconies and cladding. Then it fell, nature's perfect weapon, impaling those unfortunate enough to still be walking the streets.

The streets were so empty, these days. The sidewalks seemed comically broad without any people on them. They'd even started moving the schools inside the buildings, so some students never had to leave their buildings if they didn't want to. Even those who lived in other buildings could come and go by train, never breathing the outside air.

Ha-eun stood and stirred her rice. There was still so much of it. She'd done everything she could to make it better—more bacon, more kimchi, shreds of cheese, lacy trimmings of garlic chives—but it didn't matter. No one was coming. She shoved it roughly around the pan anyway. Then she uncovered Jun-seo's pans and began stirring the rice cakes. She was more delicate with his food than her own. He worked so hard to make something good—he even made his own anchovy stock for the sauce. Picked all the guts and heads from the dried fish with his own fingers before boiling them. Not that she'd seen it; he said he did it at home so no one would know what was going into the food. And now there was no one to see the food itself.

She replaced the lids and stared up the street. Why wasn't he back yet? Surely he'd been gone long enough to look at the traffic lights. She squinted. A chain of rides was approaching. Maybe Jun-seo had waited to watch them pass; they would have gone through the intersection he was so curious about. She heard a honking and turned. Another ride was speeding up toward their intersection. Without any conscious awareness, she looked at the traffic lights.

Both sets were green.

The rides honked at each other. The riders could do that, within the rides. It made them feel like they were in control of something, or so she heard. For a long few seconds, Ha-eun saw their faces. They looked angry, frustrated, confused. Terrified.

The cars smashed into each other.

Ha-eun covered her mouth to stop her scream before it started. She had never witnessed a car crash before. They used to happen more often, of course, but even then it was rare to see one as it happened. People saw the aftermath. She remembered that much. But it was like watching lightning strike. Or so she'd thought, until this moment.

Her feet carried her to the crash. Four cars had piled up. They looked like fighting rhino beetles frozen mid-attack. The cars hissed and sighed as though exhausted. They had been going so fast. They always looked fast when you were standing still on the corner, of course, but she could have sworn they were going faster than usual. Faster than the limit. Faster than auto-pilot rides were supposed to go.

She listened for sirens. There were none.

"Help," she whispered. She wasn't sure if she was calling or commanding. She stared up at the soaring towers of glass and steel that loomed over the intersection. Was anyone on their balconies? Had anyone seen? "HELP!"

"HELP IS ON THE WAY," one of the cars said, in a soothing voice. "DO NOT WORRY."

Inside the cars, she heard moans of pain.

"Hello?" Which car should she attend to, first? Where were the police? Or the ambulances? The wind whistled down through the empty concrete canyons. Lights everywhere—none of them the right color, none of them spinning. She had a first aid kit in her tent. Jun-seo had a better one. But you weren't supposed to move the victims of a car crash. She'd heard that somewhere. Hadn't she? "Hello?"

Something brushed her shoulder, and she screamed. She twisted, fists up, and Jun-seo held up his hands, palms open. "Easy," he said. "It's just me."

The air rushed out of her. Her shoulders sagged. She wanted to hug him. She jabbed him in the belly instead. "Where were you?"

"I'm here now," he said. "I called the police."

And just like that, she heard the sirens. The little police cars trundled up. Medical bots popped out of their trunks and spidered across the street, bright eyes scanning, claws clicking in the air, projecting stats into the icy fog. Slowly, the police officers exited their vehicles.

"Oh, hey, kimchi fried rice," one said. He glanced over at Ha-eun. "Oi. You got any eggs to go with that?"

#

Ha-eun almost thought of not coming in, the next day. In a sick twist of luck, the accident had brought in more than enough cash to cover her for the next two days—maybe even the rest of the week. Nobody ate like cops and EMTs.

But that money would not last forever. So she carefully picked her way over the sleeping bodies of the other women in the residence, and got ready to leave. Even so, one of them snuffled awake, gave her a nasty look, and rolled over with an arm over her eyes. Ha-eun was the only cart owner in the room. The others all worked the night shift at a doshirak factory, working from 6 p.m. to 6 a.m. making the lunches that appeared in convenience stores all over the city. But Ha-eun's hours were from 2 p.m. to 2 a.m. Worse, she was an independent—she paid only for the cart and the license to her space, with no hourly wage. They envied her cash flow, and she envied their security. It made living together uncomfortable.

"I'd be in the same boat as you, if my back worked like yours," she muttered. But it didn't. She couldn't stand up as long as the others could. It was that simple. She had tried, once. She had worked in a lunch factory, a supermarket, and a coffee place. It was the standing that got her pushed out, every single time. The pain was too much. And her doctor had been very clear with her—if she took painkillers every day, like she needed to, her stomach lining would open up and fill with blood. It was delicate, he said, in their video call. The robot hosting him had tilted its videoscreen head right in time with him, like a dog hearing messages on an especially high frequency.

"You used them too much, when you were younger," the doctor had said, through the robot. "Now you can't do that, any more. Not at your age."

So she shrugged on her coat and wrapped up her scarf, patted the asp in her pocket and the wad of cash between her thighs, and hastened down to the bus stop. She had a long ride. Longer than most. This was suburbia, where all the hourly workers

lived. And it wasn't so bad to spend at least a little time outside. Even when it sleeted, like today, the air was cleaner.

The bus to her first subway stop took twenty minutes. Then the first subway ride was a half hour—forty minutes on a bad day. After that it was hard to tell: it depended on how crowded the hub was, if she had to top up her transit pass, and whether she had to deposit anything in her locker. This time she did—half the cash she'd made. It was safer here at the train station than in any bank. The locker, being a part of the train station, had anti-terror measures on it that made downtown banks look like roadside vegetable stands. They'd done a deeper background check on her when she applied for the locker than any she'd endured to obtain her cart and her food vendor's license.

At first, her watch didn't work. She had to wave it over the scanner three separate times. She had four tries available; after that, the station called a human attendant to deal with potential scammers. Instead, she opted for the "lost device" option and answered a series of passphrases. Only then did it let her in.

Ha-eun finished tucking her cash into the locker, grabbed a tin of sesame oil, a gallon jug of soy sauce, and a five-pound sack of rice. She stuffed them in a fold-out roller bag. The train station had rules about perishables in lockers, but sealed items were still okay, and so it was easier to keep her supplies there rather than lugging them clear across town on a regular basis. She pushed the locker door shut, watched it bolt shut behind her, and made her way to her train.

Like most hubs, this train station felt almost more like its own small town than a station. There was a whole floor just for retail: clothing and electronics and walk-in clinics and robot diagnosticians and real estate booths where you could sit and tour some other place far away. And another for gyms and grocery stores. The food vendor licenses here were beyond expensive; most of the vendors here were grandfathered in from when the station was new. Ha-eun pushed past the ranks of other carts, noting the sneers of the people sitting inside. They had no need for space heaters here. Here everything was centrally heated. It was so warm they could even sell cold things: cold noodles and cold soups and even cold squid, dressed simply in vinegar and chili flakes.

The crowds seemed thicker than usual. Ha-eun checked the shimmering panes of glass hanging above the throng. No warnings. No alerts. And yet the escalator leading to the platform was entirely too crowded. Even if a train came now (and it was nowhere to be seen), Ha-eun would never make it to the first sitting. She looked at the other platforms. They were equally packed with people. Ha-eun peered at her watch. Nothing. She looked for a news story. The watch refused to connect to the train's network. She had no news. No messages. No connection to the outside world.

"Fucking idiots," a woman in pearls muttered. "Trapping us out here in the cold."

Fear licked up Ha-eun's spine. It was minor, for now. Just some general unease. But she thought of the condo tower looming over her and Jun-seo's carts, and how it had suddenly disappeared into the night, an empty column of darkness, the people inside it suddenly blind. And she thought of the rides throwing themselves at each other, as though a particularly destructive child had crashed his toys together deliberately.

"PLEASE BE PATIENT," the station said, in a woman's soothing voice. "THIS TRAIN WILL BE ARRIVING SOON."

An audible groan arose from the people on the platform. A man with a huge backpack jostled Ha-eun as he wriggled past. His backpack hit her in the face as he turned around. She stumbled back against her rolling bag, but the man didn't stop to apologize. A young woman in office wear caught her elbow.

"Are you all right, Grandma?" she asked.

"Just fine, thank you," Ha-eun managed to say, and moved off. Grandma. Honestly. Did she really look that old?

She pushed along the platform. Her roller bag snagged against someone's briefcase, and she got a "watch it!" for her trouble. Finally she found a bench. It was one of those studded, angled ones, the kind you needed to be a yoga teacher to sit in comfortably. A child balancing precariously on it blinked at her, and tugged on his mother's sleeve. It was made of beautiful clone sable, gleaming and grey. Ha-eun could only imagine how light and warm it felt.

"Yes?"

"Please excuse me," Ha-eun prefaced, "but how long has it been like this?"

"Almost half an hour, I think," the woman said. "The station keeps saying that the train is coming, but . . ." She shrugged elaborately. She gestured vaguely into the rafters above the platform. "Do you think the cameras are still working? I'm dying for a smoke."

"That's a good question," Ha-eun said. "For your sake, I hope they're not."

“It’s not the fine itself, of course,” the woman said while tugging at the collar of her fur, “but it shows up on your profiles, you know. The fine for smoking. The station would tell my son’s school. And the school would tell the other mothers.”

Ha-eun couldn’t really see how it was anyone’s business if someone smoked or not, but the rich lived in a different layer of reality than she did, one where they were always connected and never truly alone. She said none of this, of course, merely smiled, excused herself, and moved on. She had an overwhelming urge to find Jun-seo. Not just to ping him, but to actually see him.

As though the crowd had read her mind, the people on the platform seemed to knit together even more tightly. She squinted. A fresh outpouring of people had stepped onto the platform from the escalators. Why wasn’t the station doing anything? It was supposed to know where all the passengers were, at all times. It scraped the data from all the watches and glasses and lockets and other devices. Surely the station knew how many people were waiting on the platform and how frustrated everyone they were, by now. It knew things like pulses, heartbeats, and temperatures. She had seen people taken aside when their fevers were too high, because they might be spreading one of the flus. Why wasn’t the station sending attendants? She lifted her watch to lodge a complaint.

Her watch.

When had her watch last worked?

Granted, some functions still behaved. Time, email. The water usage in the apartment. The location of all her food in the communal fridge. But all the locative data pertaining to her location . . . when had that last worked? She hadn’t been able to access her locker or call for help when the cars crashed. It had not alerted her to any tests when the power went out in the building across from her stall.

Did it even know she was alive? Did it know she was her?

Blood splattered across her shoes.

She looked up, and two young men in front of her were hitting each other. Decades had passed since she’d last heard the sound of fists on flesh. She had forgotten how soft and small a sound it was. “I told you not to touch me!” one of the men—boys, really—shouted. His knuckles were bloody. The other boy’s face was worse; blood streamed from his mouth. They drove at each other again. The crowd widened around them.

Now she knew for certain that the watches were broken. Not just hers. All the watches. Because they should have picked up what was happening on the platform: the raised pulses, the shouting, the arc of fists in the air. The station should have learned about the fight from the watches, and sent attendants to break it up. She looked at her fellow bystanders. They were all checking their watches. They looked at each other, not the fight. They looked around at the platform. They waited for sirens. For attention. None came.

“No one knows we’re here,” she whispered. “No one’s coming to help.”

Was it really that easy to bring a station of this size to a screeching halt? She had always thought it would take something like a bomb, or a toxin, like the sarin gas attack in Tokyo. But maybe not. Maybe all it took was a sudden deafening silence from everyone’s devices.

The young men were grappling each other, now. They twisted on the frosty platform, and the crowd shoved back and forth as their bodies rolled across the concrete and advertisements. Ha-eun gripped her rolling bag tightly and positioned it in front of her, like the cattle-catcher on an old locomotive train. As the crowd ebbed away from her, she made a break for it. She ducked into the crowd on the other side of the fight, muttering apologies and keeping her head down. People squawked and screeched as she pushed through. Why had she never thought to use her rolling bag this way? It was just the thing for parting the crowd.

She leaned hard on the rolling bag and steered its stubborn, whining bulk to the escalators. More people poured out. A look of horror crossed their faces as they comprehended the sheer size of the crowd waiting on the platform. They lifted their watches. Shook them. Cursed. Tried to go back up the escalators in the wrong direction. Began trampling each other. She heard a child crying. Then another.

A thin scream rose. She turned. Someone from the edge of the crowd had fallen onto the tracks. An old man. Not much older than Jun-seo, anyway. Her heart met her throat.

“What do we do?” she heard someone shout. “Why isn’t anyone coming?”

A teenaged boy in a school uniform jumped down. Then another.

And right on cue, she heard a distant whistle and saw a cold glow pierce the winter fog. A train. Its shriek joined with the collective scream rising on the platform. She turned away. There was nothing else to do. She could only stare at the labels and logos on her groceries. They had seemed so important just a minute ago. The shouting and the noise built and built and built, echoing on the old spray-foam ceiling, making a structure within the structure. The train howled as it tried to slow itself. It moaned over the bodies in its path. She had heard that sound only once before, just after a suicide attempt on one of the other platforms at this very station. Now it was three times worse.

Beside her someone was abruptly sick into her rolling bag, and she didn't even care. She stood, wiped a spatter of bile off her sleeve, and began pushing herself the length of the platform.

"Wait, Jun-seo," she murmured. "Please wait."

#

Snow fell softly on the chaos.

Ha-eun had never crossed the city entirely on foot before. She had always used the trains to travel under the exclusive, members-only zones: the plazas and parks meant only for elite families. They lived in pockets of airy space shrouded in trees. Here there were no towers, only houses. And not the kitbashed container houses like in Ha-eun's neighborhood, but real ones, the old-fashioned kind, with gables and tile roofs and high stone fences crawling with ivy. Ha-eun made the mistake of staring, pausing long enough to be noticed by someone in a uniform.

"You can't be here," he said.

He was young. His face was completely unlined, without pores, perfect. For just a moment, she wondered just how good the corporate robot technology had gotten. Then she dismissed the thought. All the prettiest robots were supposed to look like women.

"I'm going to have to ask you to leave," he added. "You aren't authorized to be here."

Ha-eun thought quickly. "What is your name?"

He blinked rapidly. "Excuse me?"

"Your name. What is it?" Ha-eun put on the voice she used to talk to kids who shortchanged her. "How dare you stop me in the middle of an emergency like this? It's snowing! I have arthritis!"

The young man looked suitably chastened. "It's just we have a bunch of diplomats and security experts who live in this area," he said in a low voice. "And, well, they're all being called in because of what's happening. Their rides will be going very fast. Pedestrians have to be especially careful."

"I'll stay on the sidewalk," Ha-eun said, and pushed past him.

Black SUVs rumbled past her as she shuffled through the snow. She had never seen trucks so big. Government types, surely. She found herself not caring. What did it matter who they were, so long as the power came back on eventually? She peered at the homes surrounding her. Most of them had power: she heard the hum of external generators. But the towers that overshadowed them had gone dark. As she crossed under a beautiful wrought iron pergola that announced the neighborhood's exit, she saw people roving about in the streets. Thicker and thicker crowds of them, all of them waving compacts and watches and wads of cash, trying to find purchase of one kind or another. They must have poured out of the buildings once the power and the networks died. Ha-eun couldn't remember the last time the streets had been this lively.

Poor Jun-seo would have such a lineup to deal with, she realized. The thought quickened her steps. Under her feet, she heard the definitive crunch of snow. For the first time in months, the pain in her back had vanished.

After another half hour, Ha-eun rounded the corner where Jun-seo would be waiting. The stalls were dark. Curtains drawn. No lineup. Her feet carried her across the street as the pit in her stomach deepened. She was a fool for coming this far on foot. He wasn't worried about her. He wasn't waiting. He'd probably never made it in—his own route must have been equally compromised. Why hadn't she just turned around and gone home? She could be warm, at least. Warm and dry. Warm and dry and dignity intact.

"Ha-eun?"

She turned. Jun-seo stood carrying a recycling bin full of paper packaging. Poster tubes, old boxes, pulp cartons. “I was going to burn all this,” he said. “It’s a good thing you got here first!”

Ha-eun could barely find her voice. “You were waiting?”

“Of course I was waiting! All the customers told me what happened at your station. I had to wait.”

“ . . . The customers?”

“Oh, well.” He gestured at the stalls. “I sort of sold out early. This sort of thing is good for business, I guess. They’re saying it was some sort of hack, like a cyberattack on the infra—”

“But you were still waiting?”

“Yeah. Sort of stupid, huh?” He smiled sheepishly. “I guess you’ll tell me I should have gone home to get warm.”

Ha-eun scrubbed furiously at one eye. “Put that bin down!”

He dropped it. Ha-eun launched herself at him. Her arms came around him, tight. He was too thin, she thought. Strong, but too small. She wanted to fatten him up. Spoil him. And never stop.

“Hey, Ha-eun . . .” he said, “it’s okay. Everything will be fine. There are smart people working on this. I talked to one of the city people about the trains—”

“I don’t care about the trains!” She hugged him harder.

“Okay.” He patted her shoulders awkwardly. Then his arms settled over her shoulders. “Hey, if you’re all right walking, I don’t live very far from here. We could go there. I don’t think there will be power, but I do have a little propane stove, and some soju—”

“Yes,” Ha-eun said. “Yes. I want to go with you.”

He chuckled. She felt it through her whole body. “You’ll have to let me go, first, if you want to walk anywhere,” Jun-seo said.

“One more minute,” she said. “Just one more minute.”

#

Four days later, Ha-eun knew what it felt like to stand in line at her own food stall. At least, what it would be like if she herself, Ha-eun, were terrible at her job. “They should have hired us to do this,” she said, for the third time that day. “Or people like us. The city’s full of people who can do this same job faster than some dumb trainees.”

“We have to eat,” Jun-seo said. “And that means we have to wait.”

It wasn’t the food that was the problem, though. It was the fuel. Jun-seo had plenty of food in his apartment: sacks of seven-grain rice, a nice little bundle of sweet potatoes, anchovy stock, dry seaweed (they’d gotten into that early), kimchi, eggs, black bean sauce for noodles. And of course, the rice cakes and fish cakes he made every day. It should have sustained them. And it could have.

If they’d only had enough fuel to cook with.

“I thought you said you had more propane,” Ha-eun had said.

“I thought I did,” Jun-seo had said. And that was that.

Naturally all the convenience stores and other shops were out of the stuff by the time they ran out. Bizarrely, the shops were still open. They’d gone back to cash. Some places used barter—hot coffee was the new money. Wait times were murderously slow; no one knew how to total up a bill, any more, not to mention do percentages. Sales tax quickly became a distant memory.

“It’s like when the currency was failing,” Jun-seo said. “Remember that? When everyone turned in their gold?”

Ha-eun did remember. And Jun-seo was right: this was much the same. At least, the same in spirit. She had turned over her wedding band back then. The damn thing had never done her much good, anyway, even when she still wore it. This time she had turned over all her food— what rice and eggs and kimchi she still had in the stall became the army’s property, turned

over the morning after she found Jun-seo in the snow. At least, she had turned them over in theory. What really happened was that she found a notice from the army on her stall, with an itemized list of what they'd "requisitioned," and a site she could access when the networks came back in order to obtain her reimbursement. She was to give them an estimate of monetary value. She wondered how much she could fudge it. Maybe if she claimed it was fancy organic stuff they'd taken. The list they left behind didn't include brand names.

"Come on," Jun-seo said, and they shuffled forward to close the gap ahead of them in line.

She had expected chaos, but it was all very . . . orderly. The army kept on talking about the pluck and industriousness of the Korean national spirit. They pasted broadsheets reminding people how to use weather radios, and the radio stations talked about how the worst was behind them and there was nothing to worry about, how systems would come back online as soon as possible, how people were at work round the clock. Trucks with loudspeakers trundled down the newly quiet roads, blaring messages about pulling together in the struggle, sharing hand sanitizers, wearing flu masks, and where the city warming stations were.

"We're lucky we're old," Ha-eun said. "They wouldn't let us in here, otherwise."

The warming stations were only for the very young or the very old. Ha-eun didn't like to think of herself as very old, but for the moment she was willing to let the army think of her that way. And it was still better than being one of the exhausted parents in line, trying to corral kids in snow pants who wouldn't quit demanding their old devices. No, you can't play with those right now, they kept saying. No, I don't know when the network is coming back.

Inside the warming station, they had ninety minutes. There was hot tea and instant noodles and tinned fish and whatever the army had managed to put together. The first day, all the restaurants gave up their supply. The second day, there was less to work with. The army had extra propane, and they could make do, but getting the supplies in without trains was a challenge. The Japanese had promised to send supplies. And the Americans, of course. The Red Cross. The Red Cross was supposed to be good at handling things without any computers or data streams. They'd done the same in worse places, where no one had handhelds or chips. With all the smart stickers and wearables dead, nobody had any sense of inventory or location any longer, of who needed what and where. The warming station did regular headcounts. Ha-eun had heard they were doing the same things at hospitals.

"It's like going back in time," Ha-eun said.

Jun-seo sipped at a cup of instant noodles. "I like it," he admitted. "It makes me feel younger."

"What were you like, back then?"

He shrugged. "Not so different."

"You liked castles?"

"I wanted to be an architect."

This fact fell under the "Things I Do Not Know About Jun-seo" category in Ha-eun's mind. It was odd, to work alongside someone for so long, and not know the simplest things about them. "What happened?" she asked.

"I got someone pregnant."

Ha-eun hissed in sympathy. Jun-seo snorted. They stared out at the children—babies, really—in the warming station. There were yoga mats and cots set up, and someone had thought to bring in old-fashioned toys and books, the kind that didn't need charging.

"Did you have kids?" Jun-seo asked.

Ha-eun shook her head. "I wouldn't be any good at it. It was the one thing my husband and I agreed on."

"You were married?"

"For about five minutes, once."

"We should get married," Jun-seo said.

Ha-eun coughed on her tea. It almost went out her nose. "What?"

"It would be easier," he said. "Legally. What if we get separated, in this situation? The government would have no idea

who to contact. Or what if one of us is injured, or becomes ill? The other could be an advocate, in the hospital. Also I think that, when the business starts up again, we would get a better deal on cart space as a family. They prioritize family business licenses. We could move to a different corner, where there's more foot traffic. Maybe even one of the stations."

Ha-eun stared at him. "How long have you been thinking about this?"

He shrugged. "Oh, the last ten years. Give or take."

"And now you tell me?!"

The others in the warming station gave her a sharp look. In the absence of trains, train etiquette had taken over the shared spaces: one had to maintain an equal volume with one's neighbors, or risk deep disapproval. "Now?" she repeated.

"Why not now? I waited for you, in the snow. My head was telling me to leave, but my feet wouldn't let me move. And you came to me. You came right to me." He peered at her over the rising steam from his noodles. "So, Ha-eun, why not now?"

"Because . . ." She blinked. She stared out at all the families crowding around the space heaters, rubbing their arms. What if this didn't end? What if the systems never came back? Until this moment, she had not allowed herself to consider the possibility. But here in this room bathed in orange emergency light, she had to face it. They were all running scared, like pheasants flushed from the undergrowth. What attack might come next? Was this just the first phase of something much worse?

"Nothing," she said. "Forget I said anything. I can't think of a reason, aside from maybe the fact that there isn't an office to grant us a license. At least, not in the city."


"Then we'll have to go to the country," Jun-seo said. He slurped the last of his broth. "Some of the other families are leaving. I'll ask who has room for a couple of cooks."



Big and Noisy
designed by Alex Brady

A Visit to Weizenbaum

by Jamie Metzl



Doctor Weizenbaum sits straight in his chair, hands folded on his lap. His head tilts and eyes widen invitingly as Galatin enters and takes a seat. “Welcome,” he says, “would you like to tell me what brings you here today, Captain?”

“Um,” Galatin responds uneasily, not fully prepared to jump in. He observes Weizenbaum cautiously. Rail thin. Half frame bifocals. Closely cropped grey hair well advanced through pattern baldness. Blue blazer over grey slacks. “I’m . . .” His voice trails off. *I’m a warrior*, Galatin thinks to himself, *I shouldn’t be in this situation*.

Weizenbaum lets the silence settle before weighing in gently. “Are you comfortable here?”

“I’m sorry, Doctor,” Galatin responds, “I’m not used to this.”

“I understand, Captain. Maybe it will be easier to just think of us like two friends sitting down to talk. You already know that everything said in this room stays here.” Weizenbaum shifts slightly in his chair, his small movement subtly suggesting a new beginning. “I can change the décor if you’d like. The standard books and diplomas can be a little boring.”

Galatin looks down, still feeling the silence hang awkwardly. Sitting in the chair somehow makes him feel even fleshier than he has become these past couple of months. After eight years as an elite soldier at the height of mental and physical focus, the extra pounds leaning over his belt seem a harbinger of losing even more control. He tightens his stomach muscles and presses his toes through the soles of his AR670 compliant boots into the wood floor.

“Where are you from, Captain?” Weizenbaum asks, alleviating the tension.

“Texas.”

“From the city, the country?”

“I’m pretty sure that’s in my file.”

Weizenbaum picks up the cue. “This session is outside your file. That’s the point. It’s about what happens in this room, now. You requested our meeting, Captain. I’m here to help if that’s what you want.”

“The country.”

“Good,” Weizenbaum says, locking in the small gain. He tilts his head back and nods minimally. “From a farm?” he adds after a pause.

“Yup.” Galatin looks up nervously.

“Horses?”

“And cattle and pigs, a few dogs.” Galatin picks up the twinkle in Weizenbaum’s eyes and stops speaking.

“Why don’t we change the room around to make you feel a bit more at home?” Weizenbaum interjects.

Galatin can feel his tense muscles beginning to relax as the screens making up the four walls and ceiling of the small room shift to an image of vast farmland and rolling hills of corn and wheat reminiscent of his youth. He reminds himself, as if he needs reminding, that he is still locked inside probably the most heavily guarded and isolated military installation on earth.

“There we go,” Weizenbaum says, “your biometrics are beginning to show what I can already read in your face.”

Silence returns. The two look at each other, each waiting for the other to take a step.

Galatin feels the alien sense of confusion bubbling inside of him, the frightening uncertainty pushing up like a geyser. He blinks then slouches forward. “I’m in trouble. I’m in love. Maybe I’m in trouble and in love,” he blurts. He pulls his

shoulders back as if even this small act of retraction can somehow negate the implication of his words, return some element of order.

“Love is a very human emotion,” Weizenbaum responds warmly. “Sometimes it gets people in trouble. But maybe that trouble, if that’s what you want to call it, is part of being human.” Weizenbaum reads the ironic smirk flashing across Galatin’s mouth. “No?”

Silence.

“Look,” Weizenbaum adds with a soft hint of testiness, “we are here for *you*. We’ve got the hour you reserved. It’s up to you how you want to use the time, if you want to use the time.”

Galatin nods half-heartedly, still not completely convinced.

“Can you tell me about the object of your affection?”

Galatin pauses. “I’m not really sure what to say. Her name is Elizabeth.”

“That’s a very good start, Captain. Anything else?”

Galatin smiles briefly. “Okay, Doc. You’re right. I guess . . . What am I doing here if I can’t unload everything throbbing through my head and keeping me up all night?”

“Okay.” Weizenbaum elongates the second vowel.

Galatin pauses again. “It’s just that a part of me feels like I’m doing what I need to do and a part of me knows I’m betraying my training, the team, even my country by—”

“I’m very sorry to interrupt, Captain, but it looks like you are debating with yourself. There’s nothing wrong with that. Humans are not unitary entities. My advice is to just let it out. I can promise you it—”

Galatin breathes out. “What do you know about Rachmaninoff?”

“Quite a lot, as you might assume,” Weizenbaum responds.

“Well I’d never heard of him before she invited me to play a Sonata with her.”

“Tell me more.”

“We’d been chatting in one of the forums. From the moment I saw her I could somehow feel her presence. I know looks can be deceiving in VR, but I knew instinctively there was something special about her—the way she moved, the way she spoke, the way she formed her words.”

“How did that make you feel?”

“Like I needed to know more about her, obsessively. So when she invited me to meet her alone I zipped to the coordinates she gave.”

“What did you find?”

“A new world. I was standing in what looked like a palace filled with light. The high walls had tall, long windows, like a church. Labyrinths of manicured gardens stretched along the horizon as far as I could see. There was a piano and a cello at the far end of the ornate hall.”

“And was Elizabeth there?”

“She was standing behind the cello. She smiled at me and invited me to come toward her and then to sit down at the piano.”

“Did you?”

“It wasn’t like I was deciding whether to sit or not. Something inside me made it clear there was no other option. I couldn’t have stopped myself if I wanted to.”

“And then what happened?”

“I told her I’d never learned how to play the piano, but she just looked at me and smiled. It was the kind of smile I’d always hoped my mother would have offered when I came home from school as a kid, if she’d have stuck around. Elizabeth said

in this room it didn't matter, that the mechanics of how to play would sync to me as long as I was there. She stood behind the cello and lifted her bow. 'All you have to do is feel the music,' she said. Then she started playing and somehow I could feel the music entering me, like a part of my code I'd somehow lost was now, note by note, returning. I lifted my hands and rested them on the keys. Not pressing, not forcing, not moving, just resting. But as she bowed across the strings of her cello I felt my hands beginning to come alive. They didn't have a mind of their own. No. They were being channeled by a part of me I hadn't known I possessed. Playing the Sonata with her wasn't just a dream, wasn't just a fantasy, wasn't just another virtual experience, it was the truest expression of my soul. I never before really thought I had a soul. Does that seem crazy to you?"

Weizenbaum lifts an eye, as if asking whether such a question is really relevant in this room. He nods warmly, inviting Galatin to continue.

"Something about being with her, in that room, playing that music seemed so right to me even though I also knew on some level that something about it was wrong. I'm an Isolation Warrior. Everyone here is. I survived three months in the desert entirely on my own during my training, killing and eating snakes, drinking cactus water, making myself invisible. The whole point of being here is to focus on the mission, to harness the protective and projective power of extreme isolation, to not crave or even need interaction with others. Lots of lives depend on that."

"But you felt yourself craving those interactions nonetheless?"

"With Elizabeth, yes. I became almost an addict, wanting to be back in that room, playing the music with her whenever I could get away. Something about being with her made me feel alive like never before."

"Go on."

"I couldn't get enough. I was thinking about her all the time. I was overseeing an LSAD—land, sea, air drone—assault seven thousand miles away but I wasn't fully present in the battle station, not like I was trained to be, not like I need to be. Our soldiers in the field have their lives at risk. Our drones and bots almost have minds of their own protecting them, you know that. But I was just half there monitoring their terms of engagement, counting down the minutes until I could rush out and hook in to the VR pod. Can you imagine that? We're in the middle of a war and this is what I'm thinking?"

"But you hooked in anyway?"

"I felt I had no choice. You know the hours here are crazy, and there's never enough space in the VR pods, but I traded away my time in the teledildonics chamber and even my deep brain stimulation sessions to get more time with her. I stopped exercising. I forgot to brush my teeth. I didn't care if my boots got scuffed."

"And how did that make you feel?"

"Alive. Frightened. Ashamed. Confused. I've longed for certainty my whole life. That's one of the biggest reasons I joined the service, why I volunteered for this unit, why I did so well in training when most of the others dropped out. I'm an Isolation Warrior, maybe some part of me always was. They break our old selves down in the training and then build us back as part of the unit, but I was already primed the day I arrived."

"Because you sought certainty?"

"Certainty. Discipline. Structure. Purpose, even. People die from sloppiness, Doctor. Logistics wins wars but discipline shapes logistics. That's what I know. But I didn't feel disciplined at all with Elizabeth, I didn't feel certain of anything. I was becoming completely undisciplined, felt myself unraveling, but couldn't, maybe didn't want to, stop. I felt, I feel, out of control. Elizabeth took me to other places, too. We were in a valley between two tall mountains, the trees around us forming a canopy of crimson and rust. I could feel the autumn leaves crunching under my feet, the scent of the wild flowers blowing in the wind. We went to a honky-tonk bar, empty but for just the two of us. She tapped the juke box and we swayed to the old tunes. She led me into so many places I'd never known before. She understood me in a way I've never felt understood, like part of her was already a part of me from the moment we met."

"Can you tell me more?"

"Conversations I'd never known possible, or would have run away from had I known. She understood what it meant to be an Isolation Warrior. I signed up for this. I knew what I was getting in to. I knew why. But I didn't know just how alone I'd been until connecting with Elizabeth showed me the contrast. Once I understood what it meant to be connected, the alternative—my other life—started to seem unbearable."

“And how did that make you feel?”

“I’ve never felt like this before. It’s making me a little crazy.”

“You know you’re not the first to feel that way,” Weizenbaum interjects.

“But I’m the first for me.”

“And?”

“And what?”

“What do you feel are the implications?” Weizenbaum asks. “Why’d you feel like you’re in trouble? Lots of people have fallen in love before in virtual worlds. You are hardly the first and you definitely won’t be the last.”

“But that’s not the point, Doctor,” Galatin shoots back.

Weizenbaum doesn’t take the bait, tilting his head slightly.

Galatin breathes in. “I’m not an idiot, Doctor. I know the difference between what’s real and what’s not.”

Weizenbaum shifts back in his chair.

“I didn’t mean . . . What I’m saying is . . .” Galatin stumbles. “I’m feeling an urge to leave the base.” The words flow from his mouth, an unintended confession. His head pulls back in disgust.

“I see,” Weizenbaum says cautiously. “So what’s keeping you here?”

“You know the answer to that, Doctor. I’m only ten months into my deployment. I’ve got eight more to go. We’re in the middle of a war. This base is the heart of our country’s fighting machine. I’m a warrior. It’s what I do. It’s who I am, at least who I thought I was. It’s not just that I’d be court martialed, maybe even executed, for trying to leave. The very thought of leaving fills me with shame, disgust, but it’s an almost irrepressible urge I can’t seem to contain. It doesn’t seem like it’s even coming from my brain.”

“Technically, I don’t know the answer to that, Captain. The protocols of this room were communicated to you prior to your appointment. It’s best for you to assume I’m coming to this room blank, with just the wisdom I’ve picked up along the way.”

Weizenbaum’s shift halts Galatin’s momentum. “That’s a little strange,” Galatin says after an awkward pause.

“We find it the most effective approach. Maybe we should take a step back. Can you please tell me, Captain, what brought you here to Dunway in the first place?”

A confused look crosses Galatin’s face. “To Dunway, you mean the whole enchilada?”

“Mexican food is a good place to start.”

“Okay,” Galatin says cautiously, “where to begin. QRMO.”

“Which stands for?”

“I feel like you are purposefully playing stupid, Doctor.”

“Please humor me. It’s part of the process.”

“Quarantined Remote Military Operations.”

“Which are needed because?”

Galatin shrugs and glances at the time sensor on the back of his right hand, then resigns himself to playing along. “Because it’s pretty darn hard to conduct human military operations where the enemy has hacked or stolen the genomes of our officers. Because in an age of targeted biowarfare, the human is the most vulnerable part of the war machine. Because the only option we have is to completely quarantine a team of essential personnel here on the base, with no other human contact whatsoever, to be safe from targeted bioattack and monitor our drone and robotic deployments around the world. The war’s at a critical point, we all know it. They say ‘When hell freezes over, Dunway stands,’ but what they really mean is that we and our robots are the most important barrier standing between home and chaos. Clear enough?”

“The issue is not whether I get it, it’s how you express yourself. My sensor shows that your vowel-space ratio is .52, that’s

just a little bit lower than normal but suggests an element of distress.”

“Of course I’m distressed. We’ve got 862 humans on this base. All locked in this asylum for eighteen months. We live in a fishbowl, a space station that happens to be on land. We’re surrounded by five rows of barbed wire, electric fences, and hundreds of miles of desert. We can’t have any other human contact. Our blood is drawn every day. Our feces is cultured. Every move we make is monitored, and the only outlets we’re given are playing fucking ping pong and solitaire and interacting with a sealed off virtual world created just for us. And that world somehow becomes more real the longer we stay. Am I losing my mind? I’m definitely losing my balance.”

“Would it be correct to say you are struggling at the borders of reality?” Weizenbaum asks.

Galatin shrugs.

“Does reality require that much definition?” the doctor adds.

Galatin leans forward in his chair, his jaw muscles tightening. “It’s pretty darn real that our drones and peacebots are out there icing real people every day and every night. It’s pretty real that if we let our guard down our guys in the field will die. It’s pretty real that we are here resetting the terms of engagement and making senior command decisions. If I’m thousands of miles away from where the missiles are being fired or the bots are deployed, does it make the experience any less real?”

“And does the love you’re feeling for Elizabeth seem real to you?”

Galatin pushes back in his chair.

“Yes . . . No . . . I don’t know . . . I’m not an idiot. I’m not going to do something stupid for a woman made up only of code.”

“Only of code?” Weizenbaum asks, “aren’t we all made up, in essence, only of code?”

Galatin does not respond.

“Think about it, Captain. It’s a fair question,” Weizenbaum continues. “Code can evolve. The systems you are interacting with are not just getting more engaging because you are experiencing some sort of Stockholm syndrome. They are growing, changing, learning.”

“You don’t get it, do you?”

Weizenbaum tilts his head, beckoning Galatin to continue.

“There’s something corporeal, essential about being human, about cutting your finger and actually having it bleed, about dying someday.”

“Are you afraid of dying? Do you have suicidal thoughts?”

Galatin jumps up. “Do you have any idea what it means to be a human being?”

“I note your heart rate has increased by 36 percent over the past minute and your skin is demonstrating an abnormal electrodermal response. What if we change the screens in this room? You’ll be far better able to address these issues if you can find the peace within yourself.”

“I should go. Maybe this was a mistake.”

“It is my responsibility to recommend that you please sit down. You mentioned a desire to leave the base. As your confidential therapist, I must remind you that such action is not only impossible, but also a violation of Article 85 of the Uniform Code of Military Justice. And I regret to inform you, but I must in light of your reality distortion symptoms, that because Elizabeth is part of the network, you are not the first soldier to fall in love with her and you will not be the last. She learns from you, grows with you. In a way, she becomes you. Each of you.”

“What are you saying, that I’ve fallen in love with the former soldiers who served on this base?”

“With their dreams, their hopes, their aspirations, perhaps their deepest fantasies.”

Galatin freezes. Wild, divergent thoughts race through his brain. But then, just as quickly, he catches the rhythm of his breath. His body balances, his mind calms as the inchoate thought suddenly becomes clear. “It’s not her I’ve fallen in love with, you idiot. It’s the part of myself only now discovering I can love this way, that I’m capable of these feelings, that

there's so much more to me than being an Isolation Warrior.”

“And I wouldn't be fulfilling my responsibility if I didn't suggest to you, Captain, that this part of yourself will still be there when your QRMO deployment ends in eight months.”

“Your responsibility? Did you call yourself my ‘confidential therapist,’ suggest that your job is to suppress my distortion of reality so I can rejoin the wonderful reality here? You don't have an alternate agenda?”

“We are all, in some ways and by definition, limited by our code,” Weizenbaum responds coolly.

Galatin shakes his head, feeling some of his old certainty beginning to return, only somehow now different. His command voice returns. “Say what you want about evolution, but maybe *we* sometimes become human by feeling ripped apart by confusion.” He steps toward the wall, a distant red barn nestled between verdant oaks.

“I assess in your gesture what you are ninety-two percent likely to do,” Weizenbaum says softly. “I only ask that you remember what you just told me about Rachmaninoff and the palace. There are so many different ways for each of us to discover our humanity. And we each also have our duty.”

Galatin reaches toward the wall and the options panel appears. “I know that, Doctor. In a strange way, you've actually been very helpful. I feel a lot better.” His finger pauses a moment before reaching the panel. Code. Love. War. Death. Duty. Responsibility. Humanity. The concepts glide through his brain like schools of fish across a vast ocean.

As Galatin taps the *Erase Memory* and *End Session* icons, Weizenbaum sits up straight in his chair. Hands folded on his lap, his eyes slowly close.



ANTFARM

by August Cole



The airframe's vibration reached him through the pilot couch's gel padding, familiar as his wife's snoring. Three days into this sortie, his fifth weeklong mission over Yemen this year, he knew the plane's patterns of life well. He nodded off, returning to the in-between sleep and wakefulness that he described to his wife as being like “a misty summer dawn with a symphony of cicadas.” Captain Aaron Fung was proud of finding those words for her. The plane's engines hummed soothingly, and, for now, the fabs in the launch bay were silent. It was a great job for a dreamer. The recruiters should use that one.

He hummed a worn out pop tune from the 2020s that was stuck in his head while he looked down at the moonlight lazily painting the Gulf of Aden's wave tops metallic silver. Silhouetted against the moonlight were a few commercial vessels and the *USS Mattis*, a United States Armed Forces (USAF) flat-deck amphib and its dozen unmanned escorts. Nothing he hadn't already seen. He peered beneath him, not looking at his feet but essentially through his AC-46F Silent Spectre fabship, a modified 767 commercial freighter, down at a panorama image of the water below. The windowless aircraft had “Antfarm” painted in cursive black letters just below the grey sensor panels where the cockpit would have been on an ordinary jet.

He felt a stab of pain—the wrong kind. He shifted his body slightly to adjust his position so his flight helmet stopped pinching his left ear. The damned node there was going to get infected this op; another trip to the flight surgeon back at Lemonnier when this was over. Three more days until that mattered. Until then, his plane, the sky above, and below, what he believed was one of the most beautifully barren corners of TransAfrica he had ever seen, were his alone.

And then the world barged in. As it always did on dreamers.

“ANTFARM, this is SOLID GOLD, how copy?”

“Clear, SOLID GOLD. Go for service.”

“Target solution to you now. SNAKEBITE confirms green. Requests Snowman and Blizzard.”

The couch tingled three times near his calves, an almost electric feeling along the back of his legs.

“Confirming green, SOLID GOLD. Hold one on Snowman and Blizzard.”

“Roger, ANTFARM. Holding.”

He felt a faint vibration as the additive manufacturing machines, or fabs, that filled the jet’s cargo area started warming up. The plane’s onboard systems had already been communicating to the Marine Raider team’s tac computers before the mission commander made the call.

Fung blinked open the targeting screens on his helmet display and queued through the tactical map. He took a rifle-scope peek from one of the operators on the ground and a specter-like robed form paced on a rooftop. The man’s white robe had a faint blue halo from the night-vision scope, giving him an angelic look. Fung marveled at how spotless and unwrinkled the robe was. He noticed the bare feet. Then Fung’s flight gloves tingled and pulsed as the plane’s captive AI double-checked that Fab 1 and Fab 7 were online and good to go. He switched back to the overhead view and could see the pair of Marines prone one hundred meters north of the compound. They showed up as two blue dots in the midst of over a hundred red triangles marking threats, indicating smallbots and DNA mines scattered throughout the target site. The Marine exploit suits were so good now that it made the fight unfair, no matter how much bang or bots the bad guys could bring. Then there were the eight red circles overlapping in the compound, sleeping humans. Targets. The mission commander on the ground was right. Snowman and Blizzard was the right call.

Nosing down suddenly, the plane began to take up a position for the drop point. Altitude at thirteen thousand feet, right at the floor USAF permitted and Fung preferred. Let the bugs, bots and grunts get up close.

“SOLID GOLD, ANTFARM 23 confirms target solution. Wait one for CLOUD NINE.”

A wave of calm washed over Fung, none of the tension in SOLID GOLD’s voice could reach him. It was the familiar neurochemical congratulations of a good target from the crowd-sourced targeting program, known by its code name CLOUD NINE. Fung usually flew with CLOUD NINE, this was their area of operations, after all. The people behind CLOUD NINE were the tens of thousands of civilians back home in Schaumburg, Illinois, or Tampa, Florida, or commuting on the train to the night shift at a Sacramento, California motel. They were as connected to this AOR as much as any of the souls who lived out their lives below in this desiccated and forsaken place, beautiful as it was from the air. This was the CLOUD NINE collective’s op too. They had their own INsight networks to back it up. They had the image banks—the wedding pictures, the achingly lonely self-recorded music videos, the private and sometimes very public selfies. They knew everyone. Up close. It was as if the locals below had to perform to prove they didn’t need to die. The only person this collective didn’t know was Fung. As it was supposed to be in the updated rules of engagement that gave CLOUD NINE new authorities in order to reduce civilian casualties.

The true power of crowd-sourcing intelligence analysis emerged back during the first Russia-Ukraine conflict twenty years ago, when everybody from hackers to grad students to activists teamed up to unmask Moscow’s forces. No detail was too small to have value when it was on the right screen. Images and documents could have thousands of eyes on them. Artificial intelligence was the logical next step to make sense of the world’s digital noise and the American military went all-in for it in the 2020s. Meanwhile China, faltering with AI, instead developed its own millions-strong crowd-sourced milnets for the People’s Liberation Army. When the Cambridge Compact in 2028 prohibited worldwide AI use for defense and security, it meant America’s massed military processing power had to come from another source. It also gave China a leg up. Enter the hundreds of thousands of Americans working in the numbered CLOUD milnets, who were for the first time this year being given a frontline role. It worked for the PLA in hotspots around the world, why not the USAF?

Fung tabbed through CLOUD NINE’s assessment: 8,453 members engaged in the target solution; 89.2 percent target fidelity, running at 0.92 PK.

“ANTFARM 23, thumbs up. Stand by, SOLID GOLD.”

While Fab 1 pivoted on its mount, its run of one hundred black, apple-sized spheres were placed into what looked like a wooden bushel. The cellulose container sealed itself as it was moved by mechanical arm to a launch tube. Fung relaxed and allowed himself a moment of happiness. It was such a beautiful thing, all this working around him. Nothing was nearly so impressive as Fab 7. Nearly thirty feet by ten feet, essentially three massive cargo pallets configured together, it worked just as efficiently as the smaller Fab 1. In nature bigger meant slower, but what was being built layer-by-layer was anything but natural. A faint smell of burning plastic always went with Snowman, like the smell of sulfur. Instead of a hopper of high-explosive and armor-piercing shells feeding a gunship’s cannons, ANTFARM’s additive manufacturing machines drew on

tons of powdered ceramic, titanium, and other materials that were the plane's basic building blocks of death.

The big fab went silent as a six-foot long barrel that looked like an early twenty-first-century oil drum was placed into the main launch aperture on the starboard side of the plane. Out the port side went the bushel from Fab 1 and out the right went the barrel. Both started tumbling through the night sky then stabilized as microjets and fins corrected their descent.

“SOLID GOLD, ANTFARM confirms clean release. Blizzard and Snowman inbound. TOT on your screens. Tell SNAKEBITE to button up and hunker down.”

At one thousand feet above the compound the bushel burst apart, scattering the one hundred spheres into the air. At five hundred feet, the spheres split open. The Marine tracking the release on her augmented-vision feed saw the sky flash white as each sphere released a disc-like device, not much more than a ring surrounding a propeller and flight controls. The ceramic propellers spun up and the whirring became a whine in a matter of seconds as the full flock of drones swarmed into a conical formation, pointing toward the target building. They rushed toward it and simultaneously ejected their protective rings that had surrounded the edges of the five-bladed propellers. The sentry on the roof disappeared in a blur of blood and cloth, like watching a coyote ravage a hen coop. The devices had a flight time of less than three minutes so they killed efficiently and quickly.

A third of the drones were out of commission after the first strike, crashed or lodged in the sentry's body due to the charged second-skin armor he wore underneath the robe. A sharp pinch at Fung's right hip alerted him to this. Dammit. Somehow both the Marines on the ground and CLOUD NINE missed that. He would have fabbed the rotor edges differently if he had known the targets wore body armor. The rest of the Blizzard formation surged into the sleeping area to carve through the rest of the targets. The drones understood this was their terminal target and would exhaust their power supplies completing their mission, stopping only when their blades could no longer make a final revolution. It was good they did not have onboard optical sensor feeds; the engineers had gotten that one right.

That was why they had Snowman, anyway. Just behind Blizzard's launch, the barrel from Fab 7 had ejected from the AC-46. It tumbled end-over-end for a thousand feet then six control vanes sprung out from its sides, unwrapping like arms opening for a hug. The barrel stabilized as it continued on its arc downward toward the compound. This was a hard insert, the barrel's descent slowed at the last minute by a parachute fabbed onboard the plane—a deployment system pioneered for humanitarian fab drops of water purification or power generation. Then fifty feet above the ground the barrel split in half and a trio of basketball-sized spheres bounced to the ground. They impacted the compacted dirt with a puff of dust, the rough exhale of a war-torn land.

A pause. The spheres, bound in thousands of elastic filament lines that gave them the look of an oversized ball of rubber bands. Each line could be as tacky as gecko's feet or slippery as jellyfish tentacles. Sensor or weapon. One by one, the balls began to stir and in an instant they had stacked atop one another. They resembled a nightmarish snowman, shifting color and patterns to be nearly invisible with the surrounding scrub and rocks. Snowman left no tracks, filling the impact crater and scrubbing its trail as if it was never there.

Fung watched Snowman advance on the compound from overhead. Its advance toward the target on his green hued visual overlay reminded him of a virus seen under an electron microscope.

“SNAKEBITE, Snowman TOT 1 Mike. Standby.”

“Copy, ANTFARM. Huge mess in there, leave it to the bots.”

That made Fung pause. He could switch to Snowman's visual spectrum sensor feed, and if he needed to he could even patch in for direct control if they were using latent breakers and jammers on a delay. But how much more of this did he need to see? He knew what he'd done. Panning back, he looked back out over the water, once again focusing on the rippling surface and the moonlight. He grabbed an image and bumped it from his own feed to CLOUD NINE. That's what they wanted war to look like: an all-powerful view over a lonely landscape far, far above the shredded flesh and torn robes, the smell of piss and shit, sweat and tears swallowed by the dirt.

The glove's squeeze of his trigger finger snapped his focus back to Snowman. With a wink he cued up the direct feed. The spheres had entered the room in a stacked formation then spread around the room, each retreating to a corner. His POV looked down from the northwest corner of the room where the sphere had attached itself to the corner to document the scene. CLOUD NINE was going to see this, Fung thought, and have an opinion. He watched the two other spheres slowly roll around the room, sampling and assessing the damage as their filaments reached out to scan DNA from streaks of blood on the walls, shell casings examined for their origin and manufacture, tablets and phones harvested for their precious data to

prepare for the next strike be it here or anywhere in the world.

“Exploit transmission to CLOUD NINE is good, SOLID GOLD. SNAKEBITE is clear for exfil. Should have everything you need.”

“Copy that, ANTFARM. SOLID GOLD out.”

A twinge in his abdomen made Fung grimace. That always happened right before the missile threat warning indicator went off. He waited. The plane’s course was steady. No sudden change to the engine pitch. Ten seconds went by. Nothing. I must be hungry, he thought. When had he last eaten, two days ago? He cued up a protein drink, mango this time. He’d been saving that flavor for the end of this mission. Getting closer and closer, with the final tanking in thirteen hours.

The adrenaline from the mission ebbed, chased away along with the image of a mangled foot hanging by a sandal strap from a picture frame. A thin mist of blood, like a painter’s overspray, left only the image’s dark silhouette on the wall. Fung kept trying to see what was in that frame. A mountain? Or a mosque? The harder he focused on that one picture the faster he slid into sleep.

Ninety-two minutes. That was how long he slept. His entire scalp tingled, and he jolted right awake as if he’d been tossed out of the plane without a chute. FIC for sure. Forces in contact.

The plane banked aggressively to the port and began to dive toward the deck, picking up speed before leveling out. He was leaving the safety of the Gulf and heading overland. Feet dry. This must be bad. Probably SNAKEBITE.

“ANTFARM, SOLID GOLD. SNAKEBITE requests area fire mission, uh, Firewalker. Insurgent convoy 1 klick from their pos, on exfil route. Confirm?”

Fung answered before he even thought of his response. That was the kind of anticipatory action the plane did.

“SOLID GOLD, ANTFARM confirms SNAKEBITE priority support.”

Fung scanned the screen and squinted, even though the images showing the fab machines’ status were being beamed back into his optic nerve from the helmet display.

“SOLID GOLD, Firewalker status yellow. Fab 4’s jammed. Stand by.”

This might mean I have to actually get out of the chair, thought Fung. Of all the things that tested him on these long duration flights, it was getting up from the chair off schedule. It took him a couple hours to prep, and he just wasn’t ready right now. He could pop some jazz and crank the electro stim on his legs for a couple minutes, but if SNAKEBITE made contact with the tribals, he’d just have to gut it out and will his body into action. Fab 4 was prone to technical issues only manual resets could fix. But Fab 4 created Firewalker, a fuel-air explosive swarm weapon that was the deadliest on the fabship. Fab 4 had to stay online.

There was one thing he would try first, as he cued the target coordinates into the CLOUD NINE feed for a priority analysis. He tagged it with forces in contact. While the thousands of civilians in the cloud worked their way through the analytics around the target set, he executed a manual override for the flight controls. Fung, ostensibly the plane’s pilot, was actually flying it for the first time this mission. Using the haptic sensors in his gloves he brought the plane’s nose up a few degrees and pushed the power hard. The shuddering was expected, and it felt good, the kind of machine response that came from control by human hands, not an algorithm. Though if he admitted it, which he did not, the computer was really still doing most of the work even when he had the controls. The plane quickly gained altitude and once it had risen seven thousand feet, he pushed the nose down hard and to the left. The weightless moment was like being in space, just as he’d felt on the LunAirlines LEO trip he got for high school graduation.

For some reason, this seemed to work on Fab 4—maybe it was the weightlessness. But as he turned over the controls back to the plane, lumbar area tingling as if he was being chided by the machine, he saw that indeed the status was now green.

“Well, well, well,” Fung said to himself, then, “SOLID GOLD, ANTFARM. Firewalker green. Ready to service target. Waiting CLOUD NINE.”

“ANTFARM, SOLID GOLD, copy. Let me make sure SNAKEBITE is clear.” A pause. Then the command voice returned: “Status of CLOUD NINE?”

“Negative, SOLID GOLD. Hold,” said Fung. This was taking too long. Should be a standard targeting package analysis, and he was surprised they hadn’t flagged the convoy earlier. They should have been working the target even before

SNAKEBITE saw it.

“Release on my authority, ANTFARM,” said SOLID GOLD.

“Negative, SOLID GOLD. Standby CLOUD NINE,” said Fung. He blinked through screens as fast as he could. Target fidelity was only at 12 percent, but the feed was fully populated. CLOUD NINE had conviction. SNAKEBITE saw a target of opportunity. CLOUD NINE saw a tribal wedding party that was not a threat unless it was turned into one. Which it had been.

Fung’s sensor sweep of the convoy showed light weapons—no cloaks or disruptors though. A few Ohlberg antitank rockets and a half-dozen Daisu strike-recon quadcopter drones on a trailered charging pad. A lot of hardware for a wedding, even for this part of the tribal area. Under the rules of engagement, CLOUD NINE needed to validate the target. Usually, it was seamless.

“ANTFARM, SOLID GOLD requests status. Exfil window closing for SNAKEBITE.”

Fung exhaled heavily and worked through the CLOUD NINE interface, sending a hard query into the feed to make sure the intel request was getting full attention. It was a big war after all: Yemen. The CSTA (Confederated Saudi Tribal Area). Somalia. SNAKEBITE’s exfil situation was going to get worse if he didn’t get the mission back on track.

“ANTFARM, SNAKEBITE now confirmed FIC,” said SOLID GOLD. “Showing thirty-seven targets, now closing on foot.”

There it was. From off track to derailed. A constriction in his throat choked off Fung’s response. This wasn’t the plane pushing him, it was his own fear.

“SOLID GOLD,” said Fung. “ANTFARM can service the target once I’m red and free from CLOUD NINE.”

“ANTFARM, I’m working it on my end,” said SOLID GOLD.

But it wasn’t going to happen. The fidelity score was dropping even further, down just under 8 percent. This target was no good, according to the 11,320 people online now with CLOUD NINE. That was plenty of vox on the target solution. Again he pushed the FIC status for SNAKEBITE, but he plussed up a couple of the comments:

“WEDDING. LOVE. NOT WAR. WTF WRONG WITH ANTFARM 23. ANYI???”

“AI-WATAN TRIBL LEDR SELLING OFF DOTR. BEEN W8NG ALL YR 2 WATCH THIS ONE LIVE ON INSIGHT. BIG WEDNG NEEDS BIG GUNZ.”

Fung new right then and there he’d lost the crowd. Maybe for this mission. Maybe for the deployment. He force-fed some of SNAKEBITE’s spectracam footage and audio to CLOUD NINE as the two Marines sprinted away from the rushing crowd.

“FRIENDLIES APPROACHING SNAKEBITE. NO NEED FOR FIRE, ANTFARM. BTFU.”

The overhead imagery didn’t make CLOUD NINE’s case: the winding line of men and women rushing headlong with weapons raised, the drones lifting up from their cradles and swarming into a pentagon-shaped formation approaching SNAKEBITE.

He zeroed out CLOUD NINE’s feed and then, just for a moment, blacked his entire view screen. He needed a moment of peace to feel the steady drone of the engines, devouring the fragile air to keep the warplane aloft.

Fung ground his teeth to wake the helmet back up. He was not going to let SNAKEBITE get swallowed up by the mayhem below. Those were not friendlies. As aircraft commander, Fung knew he could lock out CLOUD NINE’s required approval if there was compromised network security, systems failure, or damage. If he believed this right now, like really convinced himself it was true, it would help make his case when the JAGs went over his brain scans.

“ANTFARM JUST SHUT US OUT!!! LOCKOUT!!!”

“ALL: NEW THREAT IN AOR => v e r i f y P K ANTFARM”

Fung felt the flight gloves tighten at his wrists, but he kept working the control elements in his fingers to freeze the CLOUD NINE feed and simultaneously ejected a coffin-sized box out of a port in the warplane’s belly, like a corpse being slid into a crematory.

Fung spoke quickly: “SOLID GOLD, ANTFARM has weapons release authority. Firewalker TOT 2 Mikes. Make sure SNAKEBITE’s suited up.”

There would definitely be a review of th—

Wait.

That was the syncopated hum of one of the fabs. Fab 1, for sure. Pulsing to produce a razor-sharp Blizzard swarm. An op order from CLOUD NINE flashed across his view.

“SOLID GOLD, ANTFARM,” said Fung. “Did you call for a Blizzard mission?”

A pulse of static then the reply. “Negative, ANTFARM. Threat neutralized.”

He hadn't looked. With Firewalker there wasn't much to see after a strike like that, each of the forearm-sized cylinders scattered like kindling in the wind above the target area once their coffin case cracked open overhead. A simple machine, with a two-bladed rotor like those helicopters kids would spin between their hands to make the simplest form of rotorcraft. By the time the weapons deployed into the air, they were each tasked to a target or set of targets. This created a series of points in space modeled to cause the most amount of damage when the nano-particles of aerosolized accelerant and explosive detonated in patterns, each with the singular beauty of a cloud formation. No explosion looked like another. Fung had seen dragons, moons, starfish. Once even what he swore was two eyes and a smile.

“SOLID GOLD, seeing now. ANTFARM out,” Fung lied.

What Fung was looking at was the CLOUD NINE feed. Fab 1 was indeed spinning up for a new target. Fidelity 100 percent. Target PK 0.99. He'd never seen full fidelity. It wasn't possible. But there it was. He pushed a query into the system, right to the top of the queue and saw, immediately, the fire mission was indeed a go. His screen showed a red triangle at twenty kilometers to the southwest, over the water.

Payload showed sixty spheres in Fab 1 were now in the launcher, ready to go. A wave of calm came over him. This one was out of his hands, so be it. He'd actually flown the plane once today by his own hand, it was only fair. And then the Blizzard bushel was out the hatch and freefalling. He still couldn't find the actual target, just the designation on the screen. Could be an Egyptian smuggler's submersible about to surface. CLOUD NINE could be that good at anticipating the target, maybe there were really on it tonight with fidelity like that.

A sharp stab in his neck from the suit's highest priority feedback alert snapped him back. The plane suddenly decelerated, the autothrottles idling the engines. His elbows tingled, indicating the slats and flaps were extending, then a lurch forward as ANTFARM decelerated abruptly. The sudden angry roar of rushing wind sent chills down Fung's spine.

Fight and flight at the same time as the jet slowed even further and turned hard.

The plane's defensive systems activated and Fung heard the steady ratcheting of the microflares and two solid clunks as a pair of swarm-net decoys dropped free from the aft fuselage countermeasures pods. Shit. How was he missing this?

Who was firing on him? He began to cue up Firewalker then stopped. That sound. It was the sound a saw made on aluminum, piercing as a child's scream. Then the smell of burning carbon, sharp and unnatural, wafted back to his couch.

That was when he knew. CLOUD NINE had just flown him back through the swarm of Blizzard drones. For going against them, for killing the wedding party threatening the operators on the ground. For doing the right thing: saving brothers. His first thought wasn't about safety or even of his wife. It was incredulousness. They couldn't do that.

“SOLID GOLD, ANTFARM aircraft system compromised! System compromised! Hard kill all nodes,” Fung said.

He had to get clear of the plane and the swarm. He knew if he bit his tongue hard enough, tasted blood, and began the ejection protocol, then he would be freefalling through that cloudless TransAfrican night sky. Free from the control couch, he'd glide down with spindly legs dangling in the air, eyes on the stars above. But he wanted to live and so he could not leave his plane. If he ejected now the swarm could disengage the fuselage and come right for him.

He knew what he had to do. Nothing.

If CLOUD NINE configured the swarm to cut through metal, carbon, wires, machinery—and it could as easily as it did bone and sinew—each of the flying cutters would use up a lot of power just getting through into the fuselage area. Fung had no doubt the swarm was coming for him. If it was the plane they were after, then the swarm would have just sawn off the wings before he realized what was happening. This was personal. They were after Capt. Aaron Fung, United States Armed Forces. With his tongue wedged between his front teeth, he blinked frantically and waved his arms as if he was drowning—trying to crack the control algorithm on Fab 1's last build.

Fung figured the swarm had been in the air for ninety seconds already since leaving the plane. That left him with maybe another thirty seconds before the Blizzard drones exhausted their batteries. Then he could punch out. Twenty-nine seconds. Twenty-eight. The plane's fire suppression system engaged, blasting a dense mist throughout the command area and in the fab bays. Twenty-seven. He tried to think of his wife in these last moments, but all he could think of was the plane. It was still looking after him right up until the end. Then the cutters were through, creating vortexes of aluminum powder and fire suppression dust that swirled in the fuselage's red light. Nineteen seconds. Eighteen seconds.

Fung shut his eyes and screamed, as it was the only way to drown out the sound of the swarm's blades as they closed in.



WE CAN WIN THE WAR



**YOU MUST WIN THE
PEACE**

We Can Win the War,
You Must Win the Peace

designed by EG Douglas

Codename: Delphi

“Valdez, you need to slow down,” Karin Larsen warned, each syllable crisply pronounced into a mic. “Stay behind the seekers. If you overrun them, you’re going to walk into a booby trap.”

Five thousand miles away from Karin’s control station, Second Lieutenant Valdez was jacked up on adrenaline and in a defiant mood. “*Negative!*” she said, her voice arriving over Karin’s headphones. “*Delphi, we’ve got personnel down and need to move fast. This route scans clear. I am not waiting for the seekers to clear it again.*”

The battleground was an ancient desert city. Beginning at sunset, firefights had flared up all across its tangled neighborhoods and Valdez was right that her squad needed to advance—but not so fast that they ran into a trap.

“The route is *not* clear,” Karin insisted. “The last overflight to scan this alley was forty minutes ago. Anything could have happened since then.”

Karin’s worksite was an elevated chair within a little room inside a secure building. She faced a curved monitor a meter-and-a-half high, set an easy reach away. Windows checkered its screen, grouped by color codes representing different clients. The windows could slide, change sequence, and overlap, but they could never completely hide one another; the system wouldn’t allow it. This was Karin’s interface to the war.

Presently centered onscreen were two gold-rimmed windows, each displaying a video feed captured by an aerial seeker: palm-sized drones equipped with camera eyes, audio pickups, and chemical sensors. The seekers flew ahead of Valdez and her urban infantry squad, one at eye level and the other at an elevation of six meters, scouting a route between brick-and-stucco tenements. They flew too slowly for Valdez.

The lieutenant was out of sight of the seekers’ camera eyes, but Karin could hear the soft patter of her boot plates as she advanced at a hurried trot, and the tread of the rest of the squad trailing behind her. Echoing off the buildings, there came the pepper of distant rifle fire and a heavier caliber weapon answering.

Onscreen, positioned above the two video feeds, was a third window that held the squad map—a display actively tracking the position and status of each soldier.

Outfitted in bullet-proof vests and rigged in the titanium struts of light-infantry exoskeletons—“armor and bones”—the squad advanced through the alley at a mandated ten-meter interval, a regulation that reduced the odds of multiple casualties if they encountered an IED or a grenade. Only Lieutenant Valdez failed to maintain the proper distance, crowding within two meters of the seekers in her rush to answer the call for backup.

“Valdez, this is not a simple firefight. It’s a widespread, well-planned insurgent offensive. Every kid with a grudge—”

“*No lectures, Delphi. Just get these seekers moving faster.*”

Any faster, and the little drones could miss something critical.

Local time was past midnight and no lights shone in the alley, but in nightvision the walls of the buildings and the trash-strewn brick pavement gleamed in crisp, green detail. Karin wasn’t the only one monitoring the seekers’ feeds; a battle AI watched them too. It generated an ongoing report, displayed alongside the windows. She glanced at it and saw an alert for trace scents of explosives—but with a battle in progress that didn’t mean anything. Otherwise the report was good: no suspicious heat signatures or whispering voices or inexplicable motion within the apartments.

Her gaze shifted back to the video feed. A faint gleam caught her attention: a hair-thin line close to the ground that justified her caution. “Tripwire,” she announced. She reached out to the screen; dragged her finger across the line. The gesture created a fleeting highlight on the display screen of Valdez’s visor, clearly marking the tripwire’s position. “Six meters ahead.”

“*Shit.*” Valdez pulled up sharply. A faint background tone sounded as she switched her audio to gen-com. “*Tripwire,*” she said, addressing her squad. “*Move back.*”

The tone dropped out, and Valdez was talking again solely to Karin. “*Ambush?*”

“Searching.” It was a good bet someone was monitoring the tripwire.

A set of windows bordered in blue glided to the center of Karin's screen: Lieutenant Deng's color code. The insurgent offensive had erupted all along the northern border, striking hard at Deng's rural district. At approximately 22:00 she'd been lured into an ambush. The resulting firefight had left one of her soldiers seriously wounded.

Distance did not mute the impatience—or the frustration—in Deng's voice as she spoke over the headphones, "*Delphi, where's my medevac helicopter?*"

On nights like this, a big part of Karin's job was triage. Deng's situation was no longer "hot." The insurgents had fled, and the helicopter had already been requested. Determining an ETA would not get it there faster. So she told Deng, "Stand by."

Then she swiped the blue windows out of the way and returned her attention to the feeds from the seekers, directing one to fly higher. The angle of view shifted, and Karin spied a figure crouched on the sloping, clay-tiled roof of a low building not far ahead. She drew a highlight around it. "Valdez, see that?"

A glance at the squad map showed that Valdez had retreated a few meters from the tripwire. One specialist remained with her, while the rest of the squad had dropped back under the supervision of a sergeant.

"*I see him,*" Valdez said. "*Target confirmed?*"

"Negative. Twenty seconds."

Karin sent a seeker buzzing toward the figure on the rooftop and then she switched her focus back to Deng's blue-coded windows, fanning them open so she could see the one that tracked the status of the medevac helicopter. The offensive was unprecedented and air support was in high demand. Deng's wounded soldier was third on the list for pickup. "Deng, ETA on the medevac is forty-plus minutes," Karin warned; that was assuming the helicopter stayed in the air. She slid the blue windows away again, switching back to Valdez.

Wind sighing between the buildings veiled the soft buzz of the seeker so that the figure on the roof didn't hear it coming. Details emerged as the little drone got closer. One of those details was a rifle—aimed at Valdez. "Target confirmed," Karin said without hesitation. "Shoot to kill."

Valdez was watching the same feed. "*That's a kid!*"

It *was* a kid. The battle AI estimated a male, fourteen years old. It didn't matter. The boy was targeting Valdez and that made him the enemy.

"Take the shot."

The boy fired first. He missed, but he squeezed the trigger again. His second shot caught Valdez in the shoulder, spinning her into the wall. "*Fuck.*"

"Valdez, get down!"

The lieutenant dropped to a crouch. The specialist was already hunkered down behind her. He aimed over her shoulder and shot—but too late. The kid had opened a roof-access door, retreating inside the building.

Karin checked Valdez's biometrics: high stress, but no indication that the slug had penetrated. Her armor had protected her.

"A biometric ID on the shooter is in the system," Karin told her. "You can hunt him down later."

"*Right. I'm going to drop back, rejoin the squad, and go around.*"

While Valdez reorganized, Karin switched to her third client, Lieutenant Holder. The set of windows monitoring his squad was coded orange. Holder was assigned to a district just outside the city. Tonight his squad waited in ambush for a suspected small-arms shipment coming in from the west. She checked his status: nominal. Checked the squad: noted all seven soldiers in position on either side of an asphalt road. Checked the wide-field view from the infrared camera on the squad's surveillance drone and noted the suspect truck, still at almost five kilometers away.

There was time.

Karin sighed, took a sip of chilled water from a bottle stashed in a pouch at the side of her chair, and for just a moment she squeezed her dry eyes shut. She'd already been six hours on-shift, with only one ten-minute break and that was two hours ago. There would be hours more before she could rest. Most shifts went on until her clients were out of harm's way—that's just how it was, how it needed to be. She'd learned that early.

Karin had trained as a handler for the usual reason: money. She'd needed to pay off a student loan. Two years so far, with a fat savings account to show for it. The money was good, no argument, but the lifestyle? Some handlers joked that the job was like a video game—one so intense it left you shaking and exhausted at the end of every shift—but for her it had never been a game. The lives she handled were real. Slip up, and she could put a soldier in the grave. That was her nightmare. She'd had soldiers grievously wounded, but so far none had died on her shift. Lately, she'd started thinking that maybe she should quit before it happened. On a night like tonight, that thought was close to the surface.

The blue windows slid to center again. Karin popped the bottle back into its pouch as an irate Deng spoke through her headphones. *"Delphi, I can't wait forty minutes for the medevac. I've got six enemy at-large. They have their own wounded to worry about, but once they get organized, they're going to move on the settlement. If we don't get there first, there are going to be reprisals. I need approval from Command to split the squad."*

"Stand by."

Karin captured a voice clip of Deng's request and sent it to the Command queue, flagged highest priority. But before she could slide the blue windows aside, someone opened an emergency channel—an act that overrode the communications of every handler on-shift. *"I need support!"* a shrill voice yelled through Karin's headphones. She flinched back, even as she recognized Sarno, another handler. The panic in his voice told her that he had made a mistake. A critical mistake, maybe a fatal one. *"I need support! Now. I just can't—"*

His transmission cut out. The shift supervisor's voice came on—calm, crisp, alert: the way handlers were trained to speak. *"I'm on it."*

Karin's hands shook. Sarno worked a chair just a few doors down from her. He was new, and new handlers sometimes got overwhelmed, but panic was always the wrong response. At the end of the shift, every handler got to go home, smoke a joint, collapse in a bed with soft sheets, get laid if they wanted to. Their clients didn't have that option. Sarno needed to remember that. Sarno needed to remember that however rough it got in the control room, no one was trying to end *his* life.

Right now the supervisor would be assisting him, coaching him, getting him back on track. Karin refocused, striving to put the incident out of her mind.

Dragging the gold-rimmed windows to center, she checked on Valdez, confirming the lieutenant had safely exited the alley. There were no alerts from the battle AI, so Karin switched to Deng's window-set. Rigged in armor and bones, the squad had formed a perimeter to protect their wounded soldier. Around them, dry grass rustled beneath spindly trees, and the stars glowed green in nightvision. Karin switched to Holder. He was still hunkered down with his squad alongside the road. An infrared feed from Holder's surveillance drone showed the target vehicle only a klick-and-a-half away, approaching fast without headlights.

Just as Karin brought her attention back to Valdez, the shift supervisor spoke.

"Karin, we've got an emergency situation. I need to transfer another client to you."

"No way, Michael."

"Karin—"

"No. I've got three active operations and I can barely stay on top of them. If you give me one more client, I'm going to resign."

"Fine, Karin! Resign. But just finish this shift first. I need you. Sarno walked. He fucking walked out and left his clients."

Sarno walked? Karin lost track of her windows as she tried to make sense of it. How could he walk out? What they did here was not a video game. There was no pause button on this war. Every handler was responsible for the lives of real people.

Michael took her hesitation as agreement. *"I'm splitting the load. You only have to take one. Incoming now."*

Her throat aching, she took another sip of water, a three-second interval when her mind could rove . . . this time back to the kickboxing session that started her day, every day: a fierce routine that involved every muscle—*strike, strike, strike*—defiantly physical, because a handler had to be in top form to do this kind of work, and Karin hated to make mistakes.

As she looked up again, a glowing green dot expanded into a new set of windows, with the client's bio floating to the top. Shelley, James. A lieutenant with a stellar field rating. *Good, Karin thought. Less work for me.*

As she fanned the windows, the live feed opened with the triple concussion of three grenades going off one after another. She bit down on her lip, anxious to engage, but she needed an overview of the situation first. Locating the squad map, she scanned the terrain and the positions of each soldier. There were five personnel besides Shelley: a sergeant, two specialists, and two privates. The map also showed the enemy's positions and their weaponry—field intelligence automatically compiled from helmet cams and the squad's surveillance drone.

The map showed that Shelley's squad was outnumbered and outgunned.

With little shelter in a flat rural landscape of dusty red-dirt pastures and drought-stricken tree farms, they protected themselves by continuously shifting position in a fight to hold a defensive line north of the village that was surely the target of this raid. The insurgents' ATVs had already been eliminated, but two pickup trucks remained, one rigged with a heavy machine gun and the other with a rocket-launcher pod, probably stripped off a downed helicopter. The rockets it used would have a range to four kilometers. Shelley needed to take the rocket-launcher out before it targeted the village and before his squad burned through their inventory of grenades.

The sound of the firefight dropped out as her get-acquainted session was overridden by Deng's windows sliding to the center. A communication had come in from Command. Deng's request to split the squad had been approved. Karin forwarded the order, following up with a verbal link. "Deng, your request has been approved. Orders specify two personnel remain with the wounded; four proceed to the settlement."

"Thanks, Delphi."

Karin switched to Holder. His ambush would go off in seconds. She did a quick scan of the terrain around him, located no additional threats, and then switched focus to Valdez. Cities were the worst. Too many places for snipers to hide. Too many alleys to booby trap. Karin requested an extra surveillance drone to watch the surrounding buildings as Valdez trotted with her squad through the dark streets. She'd feel more secure if she could study the feed from the seekers, but there was no time—because it was her new client who faced the most immediate hazard.

Lieutenant Shelley was on the move, weaving between enemy positions, letting two of his soldiers draw the enemy's attention while he closed on the rocket launcher. The truck that carried the weapon was being backed into the ruins of a still-smoldering, blown-out farmhouse. The roof of the house was gone along with the southern wall, but three stout brick walls remained, thick enough to shelter the rocket crew from enemy fire. Once they had the truck in place, it would be only a minute or two before the bombardment started.

Not a great time to switch handlers.

Karin mentally braced herself, and then she opened a link to Shelley. The sounds of the firefight hammered through her headphones: staccato bursts from assault rifles and then the bone-shaking boom of another grenade launched by the insurgents. A distant, keening scream of agony made her hair stand on end, but a status check showed green so she knew it wasn't one of hers. "Lieutenant Shelley," she said, speaking quickly before he could protest her intrusion. "My codename is Delphi. You've been transferred to my oversight. I'll be your handler tonight."

His biometrics, already juiced from the ongoing operation, surged even higher. *"What the Hell?"* he whispered. *"Did you people get rid of Hawkeye in the middle of an action?"*

"Hawkeye took himself out, Lieutenant."

Karin remembered her earlier assessment of Sarno's breakdown. *He had made a mistake.* What that mistake was, she didn't know and there was no time to work it out. "I've got an overview of the situation and I will stay with you."

"What'd you say your name was?"

"Delphi."

"Delphi, you see where I'm going?"

"Yes."

He scuttled, hunched over to lower his profile, crossing bare ground between leafless thickets. Shooting was almost constant, from one side or another, but so far he'd gone unnoticed and none of it was directed at him.

Karin studied the terrain that remained to be crossed. "You're going to run out of cover."

“Understood.”

A wide swath of open ground that probably served as a pasture in the rainy season lay between Shelley and the shattered farmhouse. He needed to advance a hundred meters across it to be within the effective range of his grenade launcher. There were no defenders in that no-man’s-land, but there were at least eight insurgents sheltering within the remains of the farmhouse—and the second truck, the one with the machine gun, was just out of sight on the other side of the ruins.

She fanned the windows just as the lieutenant dropped to his belly at the edge of the brush. Bringing Shelley’s details to the top, she checked his supplies. “You have two programmable grenades confirmed inside your weapon. Ten percent of your ammo load remaining. Lieutenant, that’s not enough.”

“It’s enough.”

Karin shook her head. Shelley couldn’t see it; it was a gesture meant only for herself. There weren’t enough soldiers in his squad to keep him out of trouble once the enemy knew where he was.

Would it be tonight then? she wondered. Would this be the night she lost someone?

“I advise you to retreat.”

“Can’t do it, Delphi.”

It was the expected answer, but she’d had to try.

Nervous tension reduced her to repeating the basics. “Expect them to underestimate how fast you can move and maneuver in your exoskeleton. You can take advantage of that.”

The shooting subsided. In the respite, audio pickups caught and enhanced the sound of a tense argument taking place at the distant farmhouse. Then a revving engine overrode the voices.

Karin said, “The other truck, with the machine gun, it’s on the move.”

“I see it.”

A check of his setup confirmed he had the feed from the surveillance drone posted on the periphery of his visor display.

He used gen-com to speak to his squad. *“It’s now. Don’t let me get killed, okay?”*

They answered, their voices tense, intermingled: *“We got you . . . watch over you . . .”*

Valdez’s window set centered, cutting off their replies. *“Delphi, you there?”*

Her voice was calm, so Karin said, “Stand by,” and swiped her window set aside.

“. . . kick ass, L. T.”

Shelley’s window set was still fanned, with the live feed from the surveillance drone on one end of the array. Motion in that window caught Karin’s eye, even before the battle AI highlighted it. “Shelley, the machine-gun truck is coming around the north side of the ruins. Everybody on those walls is going to be looking at it.”

“Got it. I’m going.”

“Negative! Hold your position. On my mark . . .” She identified the soldier positioned a hundred-fifty meters away on Shelley’s west flank. Overriding protocol, she opened a link to him, and popped a still image of the truck onto the periphery of his visor. “Hammer it as soon as you have it in sight.” The truck fishtailed around the brick walls and Karin told Shelley, “Now.”

He took off in giant strides powered by his exoskeleton, zigzagging across the bare ground. There was a shout from the truck, just as the requested assault rifle opened up. The truck’s windshield shattered. More covering fire came from the northwest. From the farmhouse voices cried out in fury and alarm. Karin held her breath while Shelley covered another twenty meters and then she told him, “Drop and target!”

He accepted her judgment and slammed to the ground, taking the impact on the arm struts of his exoskeleton as the racing pickup braked in a cloud of dust. Shelley didn’t turn to look. The feed from his helmet cams remained fixed on the truck parked between the ruined walls as he set up his shot. The battle AI calculated the angle, and when his weapon was properly aligned, the AI pulled the trigger.

A grenade launched on a low trajectory, transiting the open ground and disappearing under the truck, where it exploded with a deep *whump!*, enfolding the vehicle in a fireball that initiated a thunderous roar of secondary explosions as the rocket propellant ignited. The farmhouse became an incandescent inferno. Nightvision switched off on all devices as white light washed across the open ground.

Karin shifted screens. The feed from the surveillance drone showed a figure still moving in the bed of the surviving truck. An enemy soldier—wounded maybe—but still determined, clawing his way up to the mounted machine gun. “Target to the northwest,” she said.

The audio in Shelley’s helmet enhanced her voice so that he heard her even over the roar of burning munitions. He rolled and fired. The figure in the truck went over backward, hitting the dusty ground with an ugly bounce.

Karin scanned the squad map. “No indication of surviving enemy, but shrapnel from those rockets—”

“*Fall back!*” Shelley ordered on gen-com. Powered by his exoskeleton, he sprang to his feet and took off. “*Fall back! All speed!*”

Karin watched until he put a hundred meters behind him; then she switched to Holder, confirmed his ambush had gone off as planned; switched to Deng who was driving an ATV, racing to cut off her own insurgent incursion; switched to Valdez, who had finally joined up with another squad to quell a street battle in an ancient desert city.

#

“*Delphi, you there?*” Shelley asked.

“I’m here.” Her voice hoarse, worn by use.

Dawn had come. All along the northern border the surviving enemy were in retreat, stopping their exodus only when hunting gunships passed nearby. Then they would huddle out of sight beneath camouflage blankets until the threat moved on. The incursion had gained no territory, but the insurgents had won all the same by instilling fear among the villages and the towns.

Karin had already seen Valdez and Holder and Deng back to their shelters. Now Shelley’s squad was finally returning to their little fort.

“*Is Hawkeye done?*” he asked her.

She sighed, too tired to really think about it. “I don’t know. Maybe.”

“*I never liked him much.*”

Karin didn’t answer. It wasn’t appropriate to discuss another handler.

“*You still there?*”

“I’m here.”

“*You want to tell me if this was a one-night stand? Or are you going to be back tonight?*”

Exhaustion clawed at her and she wanted to tell him *no*. No, I will not be back. There wasn’t enough money in the world to make this a good way to spend her life.

Then she wondered: when had it ceased to be about the money?

The war was five thousand miles away, but it was inside her head too; it was inside her dreams and her nightmares.

“*Delphi?*”

“I’m here.”

In her worst nightmares, she lost voice contact. That’s when she could see the enemy waiting in ambush, when she knew his position, his weaponry, his range . . . when she knew her clients were in trouble, but she couldn’t warn them.

“*You want me to put in a formal request for your services?*” Shelley pressed. “*I can do that, if you need me to.*”

It wasn’t money that kept Karin at her control station. As the nightmare of the war played on before her eyes, it was knowing that the advice and the warnings that she spoke could save her soldiers’ lives.

“It’s best if you make a formal request,” Karin agreed. “But don’t worry—I’ll be here.”



The Exception That Proves the Rule

by Mathew Burrows



Alastair was the opposite of cocky. He had wanted to get into Cambridge when he was seventeen but didn’t have the right A-levels. This was a huge disappointment for his family, who had slaved to pay for his good private school education. His tutors praised his strong work habit and thought he had great promise. He just hadn’t been able to pull it all together for his exams.

Years later, he still remembered being dropped off at King’s Cross, boarding the train to his second choice—Durham University—and feeling like his life was ruined. But life had an odd way of surprising people, even Alastair. Several years later, after getting a double first in mathematics, Alastair was invited for an interview at an upscale London hotel. One of his Durham professors had connected him with a “Mr. Smith,” who was funding a small start-up. Diligent as ever, Alastair tried to research the outfit but didn’t find anything about the firm or Mr. Smith on the Internet. Alastair’s professor told him that’s not surprising. “After all, Smith is just getting started.”

Alastair spruced himself up. At university, he hadn’t cared about his appearance. He remembered his professor saying that these people are different: “They don’t like their employees to look like geeks.” He got a haircut and new clothes suitable for an office. Combing his hair one last time, he arrived promptly for his interview. Mr. Smith was different than he imagined. Middle-aged and wearing a tailored grey suit and a red and white striped tie, he didn’t seem the “start-up” type.

Mr. Smith got down to business fast. Alastair wouldn’t be able to tell his parents or friends anything about his work. The name of the firm was Predictive Analytics. It had a good West End address—not East London where most start-ups were. Because the work had to be kept very secret, he wouldn’t know what he would be working on until he started.

Alastair asked, “How do you know that I’m the right person?”

“Oh, we know.” A pause. “I know more about you than even you know. Your profile’s perfect. You’re aching to prove yourself, aren’t you?”

With that last comment, Mr. Smith hit the nail on the head.

Alastair started two days later. He hadn’t asked about his pay, but was surprised to get more than he would have asked for. The office was in a modern building in the West End, tucked behind a row of nineteenth century terraces. He got so lost on his way there that he had to go into a tuck shop and ask for directions. There were no street numbers corresponding to the address.

Mr. Smith wasn’t there, but a young man who also introduced himself as Smith said he was expected. This Smith showed him to his cubicle and signed him into the laptop on the desk. The instructions were all there, outlining his job.

On that first day, Mr. Smith told him during the secure Skype conversation that his codename would be Bletchley, in honor of the famous British military site where cryptographers breaking German codes were instrumental in the Allies’ victory during the Second World War. As Bletchley, he was told he would be putting an end to the terrorist threat. His assignment was to find a way to identify would-be terrorists before even they knew their own intentions. Alastair would have unrestricted access to a variety of secret public and private databases.

Despite his own apprehension about the difficulty of such a daunting task, Mr. Smith voiced full confidence. “Alastair, you have the right drive. If you mess up, of course, you’ll only confirm your family’s worst fears. You don’t want to do that, do you?”

For the next six months, Alastair was swept up in the pursuit. His officemates, who all referred to themselves as “Mr. Smith,” hardly talked. All day, and often all night, he sifted through reams of biographical material—including medical records—on known and captured terrorists. For a while in 2010s, London had been relatively peaceful. But then in the

early 2020s, the capital city suffered one gruesome attack after another. It was almost back to the IRA era, only the attacks were uglier. After hackers targeted the London underground, two trains collided in Piccadilly Circus, causing hundreds of fatalities, on the twentieth anniversary of the infamous July 2005 terror attack. One month later, the drinking water at an army base in Wiltshire, seventy miles outside London, was contaminated with a chemical agent that killed scores of soldiers.

England went on a war footing. Companies were moving out of London. It wasn't clear who was responsible for the atrocities. Scotland Yard thought they caught one suspect—a Scot. There had been media stories before that about how Scotland (independent since 2018) was reaping benefits from people and firms moving out of London. The Metropolitan Police went on the lookout for ginger-haired Scots and spotted what turned out to be a young Scottish tourist snapping pictures of underground stations, the Battersea power plant, and other prime targets. It turned out to be pictures for a photo album he was putting together for his grandparents. It was a total ruse. Public frustration and political pressure meant bosses at the Met, MI5, and MI6 were fighting among themselves to hold on to their jobs and diminishing influence in government.

Tuning out the noise, Alastair poured through the files and began plotting all the possible connections or links among known terrorists. This was a common technique in uncovering terrorist networks; every intelligence agency used it. The technique demanded patience. It involved poring over lists of telephone calls, banking transactions, any emails, evidence of any social media involvements, memberships in churches, mosques, or other organizations and, of course, all known family members and relatives.

He painstakingly built the link diagrams; they often showed some surprising ties, but one needed to be careful. Not everything was what it seemed. Terrorists were alert to what the intelligence agencies were up to. One military expert Alastair interviewed told him that in most social networks, strong links point to a cluster of network players. "It's easy to see who's in the group and who isn't. In a terrorist network, they want to downplay their interactions, strong ties may seem to be weak ties. An inactive network on the surface is, of course, a more difficult one to uncover. Terrorist networks are usually incomplete. There were always missing nodes."

The link diagrams also didn't reveal motivations. What would be the trigger for an attack? What makes a person—sometimes without any criminal history—turn to terrorism? In short, the link diagrams were a good start, but they were just that—a start.

It used to be that authorities looked for three, four or five degrees of separation from known terrorists. Now it was out to ten or even twelve. Alastair realized this was a fool's errand. With ten or twelve degrees of separations, whole neighborhoods of London would be filled with potential terrorists. It was truly like looking for a needle in a haystack. There had to be a better way. And Alastair thought he had one.

One day, he went to see one of the office's Mr. Smiths and asked if he could speak to somebody in the operations side. He wanted the firm to steal Chinese e-commerce giant Alibaba's algorithms.

"You got to be kidding?"

"No, really. Alibaba has found a way of predicting when a consumer will purchase an item."

"You mean like Google or Amazon?"

"Alibaba has better data. The Chinese government provides it with everything they have on everyone. In essence, Alibaba is the commercial interface of the People's Liberation Army. Google or Amazon doesn't have near as much access to the levels of personal data Alibaba has."

"But it's still not clear why you want their algorithms?"

Alastair was getting frustrated. Some of the Mr. Smith's were blockheads.

"Don't you see? They have found ways to predict human behavior—even if only on a narrow commercial level. It could be helpful for predicting human behavior in other areas."

"I'll see what I can do."

Alastair didn't have much faith in this Smith. So he began trying to develop correlations between target backgrounds, ways of thinking, number of female or male friends, school grades, whether somebody came from a broken home, how religious or not. He knew psychologists and social scientists had attempted this before but had little luck in finding patterns.

However, he soon discovered he had more detailed and valuable data than they had. In the late 2010s, the government had instituted a program whereby all primary schoolchildren would have to provide a DNA sample. The government then

analyzed the DNA, looking particularly for genetic disorders or proclivities to various diseases. The information was then fed to the National Health Service, which could institute preventive measures. It was deemed too costly for the entire adult population, although many adults voluntarily paid for the gene testing. All existing prisoners were tested and anybody apprehended on any violent criminal charges, including acts of terrorism, was too. Through MI6's links with the CIA, Alastair found out he had even greater access to DNA testing data amassed by the American intelligence service on terrorist suspects and those convicted and serving time all over the world.

Alastair never did get MI6 to steal Alibaba's algorithms. He was content, and quietly quite proud, to have assembled on his own a treasure trove of data. The only concern of Mr. Smith (the original one) was that if the Home Office, Attorney General, or courts ever found out, even during this time of crisis, the unit would be shut down. As an example, all the medical data was restricted for NHS use only.

One day, Mr. Smith came into the unit wearing the same grey suit and striped tie that he wore when he first recruited Alastair. It was close to midnight. Alastair was still working, as was usual now.

"I knew I'd find you. Making any progress?"

"I think so. I'm noticing a pattern. The medical reports have been particularly helpful. Quite a few terrorists and extremists have a distinctive gene constellation. Not that it is wholly determinative, but in combination with a certain upbringing and exposure to religion, it's rather combustible."

"Take this case," Alastair said as he pointed to a file. "See the gene pattern? With that gene, we find that people are very susceptible to spiritual leanings."

"Really?"

"Yes, the Vatican files we got from the Americans are particularly good on this. You know they have been taking DNA samples from the relics they have of many well-known saints—Paul, Augustine, Joan of Arc, Sebastian. They found similar gene constellation, inclining them to be both rebellious and saintly at the same time. A lot of the saints were not that religious in their youth—another distinctive feature. It seems the behavior doesn't get activated on its own. It has to be triggered by something."

"Something internally or externally?"

"It looks either way. We know some became terrorists after suddenly recognizing that their lives had been empty. Terrorism became an outlet. A way to make a difference. But it had a religious taint to it. More than just wanting to make a difference, they had a calling. And then a catalyst, like the Soviet invasion of Afghanistan or US troops defiling the holy land of Saudi Arabia."

Alastair continued. "It looks like it is a special gene combination. Not everybody who has this religious or spiritual side turns into a terrorist, although it seems like a fair number of the early saints did—if the Vatican got their gene sequencing right."

"Noticed any budding saints, especially in London and whereabouts?"

"I knew you were going to ask. I'm just started. Could I get some help? I finally got a girlfriend, but she is about to dump me if I don't find more time to be with her."

A week later a young woman arrived at Alastair's work.

Petite and with dark skin and flowing black hair, she was sitting in the small waiting area when Alastair came in abnormally late at 6:00 a.m.

"Are you Bletchley? The guard let me in. Mr. Smith said you would be here early and I should show up early if I was to impress you."

Alastair wasn't in a good mood. His girlfriend had finally dumped him the night before. As he had predicted. He now had second thoughts about having asked for help. What was he thinking? He would have to train her even if she had quite the qualifications. And then she would get the credit. Why didn't anybody ask him for advice before they went ahead and hired her? Talk about management dysfunction . . .

Alastair veiled his frustration as best he could, "Do you have a background in mathematics?"

“Not really. More behavioral sciences, though I had to take statistics for the degree. I’m due to get my PhD at Cambridge. Mr. Smith thought it would complement your work.” She hoped a little flattery would help ease the awkwardness. “Not that he told me a lot about what it is you’re doing. Or really anything at all.”

“We’re looking for terrorists—before they become terrorists. What’s your code name, by the way?”

“They didn’t give me one. Just Claire. Very English name, I know. My brothers and I were born here after our parents came from Pakistan.”

Alastair cut her short, “Oh, I see. All right. Here’s some files. See what you can make out. I’m still refining my algorithms.” He then marched off to his cubicle without showing her where she was to sit. Leave that to one of the Smiths.

Claire was initially very skeptical when she finally understood all that Alastair was attempting. In the whole genes vs. conditioning debate, she was firmly on the side of conditioning. Her PhD supervisor was extremely skeptical about big data and wrote extensively on data privacy and the dangers of US spying. Back in 2010s, her supervisor published a psychological profile of Edward Snowden. Human nature was too complex for it to be predictable. If the NSA had known what Snowden would do, they would never have employed him. But they didn’t, and they couldn’t.

Years ago, she had warned the authorities about her older brother Simon leaving for Syria to fight with ISIS. That’s what had brought her to the attention of Mr. Smith. He had handled the case and followed her education and career afterwards, guiding her to this point.

Weeks into the work, she was warming to the issue. Not only was the question of how to predict who becomes a terrorist intellectually stimulating, it became very personal very quickly. She knew several of the names in the files. One in particular—Gerald, her younger brother.

Was this a set-up or something by Mr. Smith all along? All of these anxieties, she knew, were tied to very real worries. But the biggest concern of all was for Gerald. Their parents had done everything to make sure he would not end up like her older brother, who was eventually killed on the Iraq-Syria border. Her parents even moved houses, partly to get away from all police surveillance. They cut ties with their relatives. Gerald used to visit their extended family back in Pakistan. No longer. And those relatives weren’t welcome in her parents’ house when they came to London. Gerald was packed off to Sherborne, an ancient public school in Dorset, far away from London and the Pakistani immigrant community or anything else that could get him in trouble—or so they thought.

Because he had been sent away, Claire hadn’t seen a lot of him. Claire didn’t live at home once she went up to Cambridge. If Gerald wasn’t at school, he was sent hiking or skiing—somewhere remote from London and where the dangers were never supposed to be ideological or theological.

The files from Alastair only indicated those with the “right” DNA. It was really her job to sort through all the other accumulated data to see if there were matches with other factors that would strengthen the inclination towards extremism or “spiritual radicalism”—the term employed by Alastair and the DNA specialists to describe the propensity.

Claire decided to put her brother’s file to the side and lose herself in her work. Weeks went by like days and her brother’s file still lay untouched. Finally, after six months, Claire decided she had to face up to what Alastair’s matrix would tell her about Gerald. But she couldn’t do it. Gerald couldn’t possibly be like Simon. Such a tragedy shouldn’t be allowed to strike twice the same family. So knowingly and falsely, she indicated there was no supporting external conditioning factors that would signal alarm or worry. She put a low priority rating on the file. Despite rarely seeing him, she told herself that she knew her brother better than any database could.

No one noticed. Alastair was working hard on perfecting his algorithms. There was a new medical breakthrough that he was using to further refine the hunt for those inclined toward radical behavior.

Claire also was knee deep. There were weekly meetings on priority targets with a special section of the Metropolitan Police. The Met would go out to the schools, youth centers, churches, mosques, and community centers to meet confidentially with the specially screened points of contact in those places and brief them on the priority targets. They stayed away from the families because of a fear of a lawsuit and the resulting publicity. They were very careful in choosing contacts: they chose, for example, headmasters over teachers, believing the latter would be more emotionally invested and therefore biased. The unit had a scare or two when a journalist got a whiff of a story, but Whitehall was usually able to snuff it out. Once the Prime Minister had to call the editor of the *Guardian*. A decade or two ago, it wouldn’t have worked. But the terrorist atrocities of the past few years had completely changed the atmosphere and even left-wing newspapers like the *Guardian* toed the establishment line. Nobody wanted to be responsible for the carnage that everybody constantly felt was imminent.

Mr. Smith thought his unit had performed splendidly. He reckoned that Alastair's work had nipped at least two dozen proto-terrorists in the bud. It had been a year or so since there had been a major attack. No one could say for sure but there was general consensus among those in the know that the unit's work had been a critical factor. The unit was then reinforced. Alastair had been moved into an actual office—not the corner one—but it had four walls and a door, which he kept closed. He now had a number of assistants, all of whom were very much overworked and were secretly looking for ways to move on. The original Mr. Smith patted himself on the back for hiring Alastair.

Alastair even had a late night meeting where the Prime Minister personally congratulated him on his work. “Unfortunately,” she said, “I can't put you in for a knighthood because there would be publicity. Even your parents won't know. What a shame! However, we are honoring Mr. Smith with a knighthood.”

It's just typical. Alastair thought to himself. *I always end up second best and unrecognized.*

Claire had developed a network of consultants—psychologists, social workers, imams, and educationalists—who helped her evaluate the files and advise the Met on the best approaches for defusing extremist proclivities. She had gingerly felt out her old supervisor at Cambridge, but it was clear that he was an “old school” thinker and it would be best to stay clear.

Outside of her work, she had little social life. Even with her family she was distant. She couldn't really talk about her work. They were polite about not continually asking, but she could tell they were dying to know.

She hadn't thought about her younger brother since downgrading his file, forcing herself to create some distance after doing something that occasionally kept her up at night. During an infrequent visit to her parents' house in Ealing, she learned her brother had gone to Doha in the Gulf. Her parents said Sherborne had an exchange program there. The emir had in fact gone to Sherborne many years ago and had even set up a replica in Qatar. Gerald had gone out to teach there during his gap year before university.

She blurted out, “Is that wise? I mean . . . it's such a long ways away.”

Her mother said, “Gerald was a model student at Sherborne. He got good grades, and there were never any complaints about his behavior. Qatar isn't Syria, if that is what you mean.”

Claire felt her mother was angry with her for even intimating there could be a problem. Ever since the older brother had died, her mother had turned her affections toward Gerald.

As she was leaving, her father sidled up to her and whispered to her that Gerald had gotten into a “spot of trouble” as of late. When he was back in London for a visit, a local imam told the father that he was going around with some “very disreputable people.” The father thought the imam was referring to drinking or perhaps a girlfriend. Gerald certainly drank, but usually not to excess—at least around his parents.

“Do you think it was something else?” he asked.

“I don't know, father. Maybe you should talk to the imam.”

When Claire was back in the office the next day, she started searching through various databases to see if Gerald's name cropped up. She had to do it before all the Smiths arrived to make sure no one could see what she was doing. Fearful of leaving a digital trail, Claire did not search using Gerald's name. She thought she remembered the imam that her father had referred to. He had come up in other conversations. Possibly he had reported something or told somebody else. She also looked through police reports from her parents' neighborhood in case there had been reports of unruly drunken behavior.

She had almost given up before she caught sight of a Met report on an incident at Ealing Central Library. One of the librarians saw a young man using one of their computers to look up extremist websites. The librarian didn't ask his name. The computer's hard drive was subsequently examined. The young man had logged in, using “Digby” as his username. The Met had gone around the area, visiting every person listed with Digby as both first name and surname. They concluded it must be a pseudonym or something. Claire, however, knew it was the house that Gerald lived in when he was at Sherborne School.

Claire stood up to see if any of the Smiths were watching and walked unsteadily to the office bathroom where she threw up.

Gerald was a willing victim. He had been a rebel in his own mind for so long, fighting in secret against his parents' conformity that his point of no return came without warning during an extended visit home between terms from the school in Doha. It was the first visit he did not catch his parents talking in hushed tones about his martyred brother. Simon's sacrifice resonated more than ever now that he was being willfully forgotten by their parents. Gerald had his own high

standards to live up to—and it wasn't to be a proper English young man.

As a youngster, however, Gerald wanted to please his parents and initially identified with his English schoolmates at Sherborne. The problem was that his instructors and schoolmates saw him as a Pakistani. They were not rude to him. There were other Pakistanis, Indians, Gulfies, and a whole bunch of others who weren't English. The school, in fact, went after wealthy foreign families to get them to send their children to the school. There were more of them who could afford the high fees than there were English families these days. But coming to Sherborne didn't make foreigners accepted as English, despite getting a proper English upper-class education.

For many years at Sherborne, Gerald was confused and unhappy. He wanted to be like his English schoolmates, but he wasn't accepted. The Pakistanis or Gulfies at school also did not accept him either. To them, he was obviously English. He was betwixt and between.

There was one professor whom Gerald confided in about his situation. His family many generations ago had come from India when it was a part of the British Empire, but they did not go back. They also saw themselves as English but had suffered enormous prejudice and discrimination until recent years. He told Gerald that pain is good for building character. "You either end up as a Nobel-winning novelist or a bomb thrower. Make sure it's the former."

But Gerald was finding it hard to square the circle. He got good, but not great, A-levels. He was slated to go to Reading University. His parents put on a brave face, but it was clear he had been a disappointment, particularly after Claire had gone to Cambridge. He was going to do the usual backpacking around Southeast Asia, a popular sojourn among English students during their "gap year," but the headmaster pointed out an opportunity to teach and coach soccer at Sherborne's sister school in Doha instead. His parents thought this was a better option than wandering about in Malaysia or Thailand. They were confident that with Gerald's elite education, he could never turn into an extremist.

Despite his parents' confidence in him, Gerald had grown curious about jihadist groups even before going out to the Gulf. Hence his forays on the Net. But, in the end, it was a chance meeting with a woman in her thirties who recognized him as Simon's younger brother that led him past a point of no return. Gerald was sitting in a café in Islington when Rachel, wearing a scarf to cover her head, came up to him. "Aren't you Simon's younger brother?"

Gerald looked startled. Then suspicious.

"Don't get up. Simon used to talk about how much of a spoiled brat you were. But you've turned out to be very handsome young man with his same eyes and idealism."

Gerald looked down at his coffee. Without looking up, "How well did you know my brother?"

"I came back shortly after he was killed. Initially, the police hounded me, but now they leave me alone." She lowered her voice. "You see my father is a MP. He thinks I'm going through a phase and if the police let up, I'll be turn back to being his 'baby.'"

"You've given up the fight?" Gerald began to lift his head up.

She didn't answer. "You should meet some of my friends."

"I'm curious about how my brother died."

"Well, then, come along. Next Thursday after work." Rachel gave him the address near St Bart's Hospital in Smithfield.

Over the next two weeks, he got to know the group. Most were what was once called well brought up—English on the surface but rebels underneath. A few had Gerald's same experience of having suppressed an immigrant identity without gaining acceptance, but others had no immigrant background to feel conflicted about.

They didn't talk politics much. Several had even fought in Syria. And initially that's what drew him to them. Then little by little, they began to feel him out. Would he like to do some research for them? He spent hours at the local library.

The initial questions would take only a few minutes, they said. A lot of the research seemed pretty mundane to Gerald. They wanted to know everything he could find on the construction of Wembley Stadium. They were very interested in the ventilation system: mundane stuff.

He told them he was about ready to leave to go to Doha. They flipped out. "You can't do that. It'll raise suspicions with the police."

“Suspect what?”

“Your association.”

“I’ve just hung out. I haven’t done anything.”

Gerald was a little disconcerted, but had second thoughts about the Gulf trip. London was proving a lot more interesting. For the first time, he was beginning to make real friends who believed in something. He was discovering a lot, including how he resembled Simon.

He talked to his new friends about moving into one of their flats. “Slow down. It is bad enough we’ve had these socials. From now on, we’ll no longer meet. The best thing is to be living with your parents in boring, suburban Ealing. Wait for us to contact you. Simon started this way too, remember.”

Gerald was furious, but had no recourse. He told his parents he was not going back to the school in Doha. They were puzzled by the decision, which came out of the blue, but did not put up any opposition. His new friends got back into contact a week after that, leaving him notes at the local coffee shop.

The research on Wembley turned out to be more interesting than he originally thought. His virtual headset allowed him to go around the stadium. Some Wembley officials had security concerns about a publicly accessible full-scale virtual tour that allowed viewers into the very bowels of the stadium infrastructure. Others had argued that having the public familiar with the stadium would cut down on seating time. Also, in case of emergency, having a well-informed public would be an advantage. This last argument won the debate.

Gerald was surprised when Rachel intercepted him one day outside the coffee shop.

“Walk with me.” She walked ahead for a while with Gerald following. “Are you up for a football match this weekend?”

“You couldn’t mean the FA Cup final?”

“Yes, that’s the one.”

“Fat chance to get a ticket.” Before he finished she held up a single ticket. “Brilliant! But you’re not going?”

“No. I’m helping out at the hospital. You’ll do all of us a favor if you’ll take it and go.”

“Certainly. But are there any strings?”

“Just one. I’ll meet you outside Wembley tube just before the game. All right? I must rush.”

They met just as planned. Rachel had a package with her. “You know all the research you did on Wembley. After the match starts, you need to go down to the ventilation room. Do it within twenty to thirty minutes after the start. Aiyaz will meet you there. Please follow the instructions he gives you.”

“Who’s Aiyaz?”

“He’s a friend you haven’t met. Friends don’t ask questions, OK?”

The match was so good Gerald almost forgot to leave his seat. Once he did, he was surprised how easily he found his way. And how suddenly nervous he was. In the rush of the crowd he had lost himself, and now he was alone wending his way into the stadium’s bowels.

A man with a light build and dark wavy hair paced outside the ventilation door, just where he was supposed to be.

“Rachel gave you a package,” said Aiyaz.

Gerald nodded and began to hand it over, no longer thinking of the game.

“No, I don’t need to see it. I’ll take you in and show you how to release the contents into the system. But won’t stay.”

“Is it dangerous?”

“No, not at all. The stadium won’t smell nice. We want to make a statement. After the West has treated Muslims, it’s time they had a taste of what putrid flesh smells like. You had a brother martyred, didn’t you?”

“Yes.”

“Do it in his memory.”

Gerald nodded. They went into the ventilation room. Aiyaz showed him how he should open and dispense the contents of the package.

“Remember, give me a minute and then start the process.”

“What if somebody comes?”

“They won’t. I’ve already tampered with the security code. Their cards won’t work. But you can get out.”

After Aiyaz left, Gerald took out his iPhone and made sure he waited a full minute. Then he opened the package as instructed and emptied the substance into the ventilation system, careful to ensure he got it all in. He slipped out unnoticed and went back to his seat. His neighbor told him he missed the best part of the match. Gerald told him, “No, I’m sure the best is yet to come.”

But nothing happened. No foul smell. Just a stunning day out for the thousands in the stadium—or so everybody thought as they filed out. Gerald shuffled out, despondent he had failed Rachel—and not lived up to his brother’s memory.

Unbeknownst to Gerald and the tens of thousands of other fans, he had released smallpox virus throughout the stadium. If the exposed fans were not vaccinated within four days of being exposed to the virus, there was at least a 30 percent chance of dying. Antibiotics were ineffective against it. There was no known cure. Because it had been largely eradicated, nobody was vaccinated against it. The United States, Canada, and Russia were the only countries with an emergency supply of smallpox vaccine.

Smallpox is spread through inhalation of air droplets or aerosols. Therefore, it is important to isolate a person diagnosed with smallpox immediately, avoiding any kind of contact. It spreads quickly through populations without any symptoms developing over the two weeks after contracting the disease.

The match’s ninety thousand fans went home—whether to London, other parts of England and the British Isles, Europe or the Americas, Africa, and Asia—unaware they were exposed to a fatal disease. The infected then passed it on to loved ones, colleagues, shop clerks and, everyone else they had close contact with. By the time people with the first symptoms began showing up in hospital emergency rooms, millions had been infected. Gerald and his parents were no exception.

Unrepentant at first, he died at home, having locked himself in his room out of fear he would confess to his parents what he had done. He never heard from Rachel again.

The nation was on lockdown. Nobody knew who would come down with the disease. Those without symptoms could not go home because they were needed to run the government. The only exception being those with family members already showing symptoms. They were sent home and then quarantined. Hospitals could not accept new patients. People died at home. Soldiers dressed in space suit-like protective gear delivered emergency food supplies to the quarantined.

Once it became clear what had happened, the Prime Minister had summoned the Cabinet by secure videoconferencing. She had sought emergency vaccinations from the United States and Canada, but they had refused. They were starting to vaccinate their populations and were worried about not having enough supplies. Russia was the only country to help out England.

“So much for the special relationship,” was the PM’s only comment.

Practically living secluded in your office turned out to be an advantage. Alastair was relieved to be spared the disease, but he soon after suffered what he saw as a worse fate. The PM disbanded his unit. In fact, she wanted all reference to it expunged from official records. In her mind, the public and even future generations were never to know anything about it. It had failed singularly. If the public found out, it would turn on the government and the chaos would get even worse.

In the aftermath, Claire confessed to her misdeed to Alastair, then to Mr. Smith. Alastair tried to use the revelation to get 10 Downing Street to reverse course on the unit’s closure.

Mr. Smith helped Alastair plead the unit’s case to the PM over VTC: “It actually worked. If Claire hadn’t covered up her brother, we would have investigated Gerald and prevented . . . all of this.”

The PM wasn’t buying it. In her mind, a public revelation of what Claire did would be even more embarrassing for the government. She never said a word during the conference call.

Alastair was fired soon after. His consolation: he was among the last to go, outlasting all of the Smiths. And especially Claire. She had broken down in tears one day within minutes of arriving and was placed under psychiatric watch at a facility in Scotland. Doctors there thought there was a good chance she would kill herself. Mr. Smith would never speak it aloud, but he was content to have her out of sight, perhaps for good.

The original Mr. Smith was the only one spared. He kept his knighthood, mostly because the government would have to reveal too much to remove it.

On Alastair's last day, Mr. Smith took him out to his club—the Athenaeum on Pall Mall. As might be expected during a pandemic, it was mostly deserted—everybody being scared of any social activity. There was, at least, an honor bar.

After settling in to a pair of leather armchairs oddly close for a time of disease, Smith patted Alastair on his shoulder. “Don't worry, Bletchley, we'll get the unit up and going in a couple months after all of this blows over. It will be tough, I'm afraid, bringing you back on. Certainly proved yourself, though. Nearly there with all of it. We'll have to think of something else for you—out of the spotlight.”

Alastair rattled the ice in his glass and knocked back his gin and tonic. *Yes, that's the story of my life.*



Coffee, Wi-Fi and the Moon

The unknown story of the greatest cyber war of them all

by Nikolas Katsimpras



CLICK! CLACK! DING! After more than 40 years, the vintage thumping sound of dusty Underwood, Olivetti and Remington typewriters filled, once again, the New York *Gazette* editorial room. Looking down the rows of desks, the gloomy floor is filled with the flickering light of hundreds of candles bouncing off the lifeless, pitch-black computer screens.

Today is the 24th day of continuous blackouts in New York, Washington, DC, Moscow and hundreds more cities worldwide. It is considered to be only the beginning of a spiraling conflict. Who could have imagined though, that the greatest escalation of the 21st century might have started with a single cup of coffee?

On that fateful morning of May 4, Russian President Vladimir Putin passed with his entourage in front of the Starbucks located at Ohotnyy Ryad Street, just walking distance from Kremlin. Putin's fourth term could eventually have broken the twenty year presidency mark, had he not died the minute he stepped foot inside the store. For the first time in weeks, new information has emerged shedding light on the burning questions of what transpired.

The initial speculations over the cause of death involved complications due to Putin's heart operation at the Russian Cardiology Research and Production Complex in 2019, about a year after the elections. However, the G.R.U., Russia's Main Intelligence Directorate, almost instantly accused the United States of interfering with Putin's pacemaker.

President Putin's active lifestyle demanded an enhanced pacemaker that allowed his doctor to monitor his health from afar over the Internet. Its manufacturer, Russian Elestim-Cardio, has long vouched for the bulletproof security of its Wi-Fi enabled pacemakers, which is why Putin selected the relatively small, but local company. For Putin, this was a testament of faith, in an effort to promote Russian engineering.

According to confidential reports by top Russian officials, their intelligence community has been investigating three scenarios, all of which include the Wi-Fi capabilities of the implant. These scenarios refer to a long known vulnerability of Wi-Fi enabled pacemakers and the way they connect to wireless networks. This was also the reason why former US Vice President Dick Cheney replaced his defibrillator in 2012 for a non-wireless version, which he maintained until his passing in 2016.

According to the first scenario, hackers had infiltrated the wireless networks of Starbucks in Moscow, selectively changing the networks' names and identifiers. This masked them as familiar networks for various pacemakers, cell phones and other Wi-Fi enabled devices to trick them into connecting automatically. When Putin entered the store, hackers took full control over the device.

The second theory is based on the same network-imitating principles, but requires the use of a microdrone near Putin, in order to create a hotspot with the same effect. The microscopic drone would have been able to create a Wi-Fi network to control devices in its vicinity, while connecting to its user via the mobile network.

The third scenario is the most probable one, according to experts, and includes Putin's doctor himself. Dr. Renat S. Akchurin was responsible for prolonging President Yeltsin's life enough for Yeltsin to win the 1996 elections and eventually select Vladimir Putin as his successor. Akchurin was also the one who performed the 2019 operation, saving Putin's life. The irony is that Akchurin might have, in the end, cost Putin his life due to his browsing habits.

Elestim-Cardio claims that its devices' security is impeccable and that every hacking incident in the past involved individuals breaching the strict security protocols. According to the Russian medical technology company, hospital and company security teams are required to approve any new software application. Dr. Akchurin has been accused of being lax with such security protocols and frequently checking Mr. Putin's signs through his personal laptop. Had he failed to follow the appropriate security directions, infiltrating his laptop would not have been a challenge for any skilled hacker. Dr. Akchurin's laptop could have been the Trojan horse into Putin's heart.

In a political perfect storm, the demise of the Russian president came at a period of record high tensions between the United States and Russia. The Kremlin's plan to pursue its extensive moon mining operations of Helium-3 has further deteriorated US-Russian relations, already in decline since the 2014 Ukraine crisis. According to Russian newspaper *Pravda*, Russia will launch its industrial mining of Helium-3 on the moon this year. Numerous sources have confirmed that there are serious delays in the program, but Russian officials still claim to be much closer than anyone else.

Helium-3 is a rare non-radioactive isotope of helium, considered as the second-generation nuclear fusion fuel. It is energetically immensely dense and does not produce nuclear waste. According to Dr. Kulcinski, of the Fusion Technology Institute at the University of Wisconsin-Madison, 40 tons of He-3 can provide the entire electrical consumption of the United States for a year. Dr. Kulcinski claims that at \$1 billion per ton, "the energy cost of He-3 is equivalent to oil at \$7 per barrel." The moon contains ten times more energy in He-3 than all the economically recoverable coal, oil and natural gas on the Earth. According to various estimates, one ton of Helium-3 would cost \$800 million to bring back to Earth, with a market price of \$10 billion per ton, making it highly profitable.

The United States, Russia, China and India have been racing to build both the first Helium-3 nuclear plant and an He-3 mine on the moon. Despite its rarity on Earth, it is abundant on the lunar surface.

As a result, for the past several years, tensions have been escalating due to the absence of an agreed international legal framework for economic exploitation of the moon. Different lunar areas contain different amounts of He-3, transferring the geopolitical games of the past centuries onto the virgin surface of the moon.

Putin's Russian pride would have never accepted the United States beating Russia to the moon again, which is why he was adamant about Russia being the first to mine there. The alleged assassination of Vladimir Putin is considered a direct attack to Russia and a threat to its number one strategic priority.

Instigated cyber rumors about US involvement in the hacking of the pacemaker spread like a digital wildfire, causing the collapse of markets worldwide. US cyber black ops were extensively blamed for the attack, resulting into the colossal mobilization of Russia's hacking machine.

The Russian response was immediate, launching a catastrophic hacking attack on the US power grid, Wall Street, hospitals, traffic lights and airports. The attack used an immense web of latent threats that have been placed inside the American grid for years, as safeguards. Russia, having drawn experience from Stuxnet practices, created a highly complex and undetectable web of viruses that remained dormant in the American system. Aging US infrastructure, minimal oversight of private energy companies' security systems and the element of surprise caused a total systemic failure.

Fortunately, the network of land based nuclear missile sites are shielded from such attacks. Despite the multiple cultural and personnel performance issues of the past, the outdated, offline technology of the system, along with its mechanical safeguards, have been able to protect it from modern online threats. This does not apply to nuclear power plants, which can easily be manipulated into an escalating meltdown without any prior warning. Iran was the first to realize the potential

of these highly sophisticated, clandestine cyber intrusions back in 2010, when the Stuxnet virus significantly damaged its nuclear program. Stuxnet remained undetected for years, finally causing irreversible damage to Iran's centrifuges, without raising any warning signs to the monitoring personnel.

In order to prevent such attacks on nuclear power plants and spent fuel pools, the Clinton administration ordered all plant operations shutdown. Such an attack could have led to an unprecedented widespread radioactive contamination of the continental United States. President Hillary Clinton enacted such a dramatic measure, given the apparent vulnerability of the systems and the already critical condition of the aging spent fuel pools nationwide.

The Russian government believes that the Central Intelligence Agency assassinated Putin in an undercover attack to freeze the moon mining operations. However, cyber security experts around the world, including the prominent Moscow-based Kaspersky Lab, have been quite vocal about significant indications that Beijing may be behind the pacemaker hacking and the extensive subsequent cyber instigation.

Analysts now believe that this may have been China's stealthy checkmate to catalyze the downfall of US-EU-Russia dominance with a single move. This also might have set the gears in motion for the Chinese yuan to monopolize international trading and currency reserves.

At this point, the damage is incalculable. Markets around the world have experienced an unprecedented collapse. Both EU and US technological infrastructures have incurred extraordinary damage. These are the perfect conditions for non-state actors, who exploit the ongoing interstate cyber warfare. Amidst the cyber chaos, banking systems have fallen apart, with information of potentially billions of users leaked to criminal organizations around the world. All ATM and credit card transactions have been frozen.

Considering the devastating impact of the cyberattacks, many expect NATO to invoke an Article 5 collective defense response. Could this be the first time that a cyber conflict escalated to the point of bringing humanity to a monumental military engagement? In a symbolic gesture for the state of world peace, Japan also just announced the cancellation of the 2020 Olympic Games.

Our illusion of peace after the fall of the USSR now feels like a distant dream. It seems that our global interdependence has indeed made us more vulnerable. The chronic negligence of complex issues such as cyber security, the modernization of international legal frameworks, and even the environment, might have brought us, yet again, to the doorstep of humanity's darkest hour. From world war to the sound of typewriters at newspaper offices around the world, history does repeat itself. How disappointing is it for the most diachronic cliché of them all to be proven right.

As the portable Remington punches these last words, the sun is setting in New York. Click! It is the end of May and the last rays align with the metropolitan grid. Click! The famous spring Manhattan Solstice fills the sixth floor of the *Gazette* with a motherly warm orange color. Clack! However, everyone is cold. Will the Starbucks crisis pick up where the Cuban missile crisis left off eighty years ago? Ding!



A Need for Heroes

by David Brin



Roland fingered the rifle's plastic stock as his squad leaped off the truck and lined up behind Corporal Wu. He had a serious case of dry mouth, and his ears still rang from the alert bell that had yanked them out of exhausted slumber only an hour before.

Who would've imagined being called out on a real raid? This certainly broke the routine of Basic Training—running about pointlessly, standing rigid while sergeants shouted abuse at you, screaming back obedient answers, then running some more until you dropped. Of course the pre-induction tapes had explained the purpose of all that.

“ . . . Recruits must go through intense stress in order to break civilian response sets and prepare behavioral templates for military imprinting. Their rights are not surrendered, only voluntarily suspended in order to foster discipline, coordination,

hygiene, and other salutary skills . . .”

Only volunteers who understood, and signed waivers, were allowed to join the peacekeeping forces, so he'd known what to expect. What had surprised Roland was getting accepted in the first place, despite mediocre school grades. Maybe, he thought, the peacekeepers' aptitude tests weren't infallible after all. Or perhaps they revealed something about Roland that had never emerged back in Indiana.

It can't be intelligence, that's for sure. And I'm no leader. Never wanted to be.

In his spare moments (all three of them since arriving here in Taiwan for training) Roland had pondered the question, and finally decided it was none of his damn business, after all. So long as the officers knew what they were doing, that was enough for him.

This calling out of raw recruits for a night mission, didn't fill him with confidence though.

What use would greenies like us be in a combat operation? Won't we just get in the way?

His squad double-timed alongside a towering, aromatic, ornamental hedge, toward the sound of helicopters and the painful brilliance of searchlights. Perspiration loosened his grip on the stock, forcing him to hold his weapon tighter. His heartbeat quickened as they neared the scene of action. And yet, Roland felt certain he wasn't scared to die.

No, he was afraid of screwing up.

“Takka says it's eco-nuts!” the recruit running beside him whispered, panting. Roland didn't answer. In the last hour he'd completely had it with scuttlebutt.

Neo-Gaian radicals might have blown up a dam, someone said.

No, it was an unlicensed gene lab, or maybe an unregistered national bomb—hidden in violation of the Rio Pact . . .

Hell, none of the rumored emergencies seemed to justify calling in peach-fuzz recruits. It must be real bad trouble. Or else something he didn't understand yet.

Roland watched the jouncing backpack of Corporal Wu. The compact Chinese non-com carried twice the weight any of them did, yet he obviously held himself back for the sluggish recruits. Roland found himself wishing Wu would pass out the ammo now. What if they were ambushed? What if . . . ?

You don't know anything yet, box-head. Better pray they don't pass out ammo. Half those mama's boys runnin' behind you don't know their rifles from their assholes.

In fairness, Roland figured they probably felt exactly the same way about him.

The squad hustled round the hedge onto a gravel driveway, puffing uphill toward the glaring lanterns. Officers milled about, poring over clipboards and casting long shadows across a close-cropped lawn that had been ripped and scraped by copters and magnus Zeps. A grand mansion stood farther upslope, dominating the richly landscaped grounds. Silhouettes hastened past brightly lit windows.

Roland saw no foxholes. So maybe ammo wouldn't be needed after all.

Corporal Wu brought the squad to a disorderly halt as the massive, gruff figure of Sergeant Kleinerman appeared out of nowhere.

“Have the weenies stack weapons over by the flower bed,” Kleinerman told Wu in Standard Military English. “Wipe their noses, then take them around back. UNEPA has work for 'em that's simple enough for infants to handle.”

Any recruit who took that kind of talk from the instructors personally was a fool. Roland just took advantage of the pause to catch his breath.

“No weapons,” Takka grouched as they stacked their rifles amid trampled marigolds. “What do we use, our hands?”

Roland shrugged. The casual postures of the officers told him this was no terrorist site. “Prob'ly,” he guessed. “Them and our backs.”

“This way, weenies,” Wu said, with no malice and only a little carefully tailored contempt. “Come on. It's time to save the world again.”

#

Through the bright windows Roland glimpsed rich men, rich women, dressed in shimmering fabrics. Nearly all looked like Han-Formosans. For the first time since arriving at Camp Perez de Cuellar, Roland really felt he was in Taiwan, almost China, thousands of miles from Indiana.

Servants still carried trays of refreshments, their darker Bengali or Tamil complexions contrasting with the pale Taiwanese. Unlike the agitated party guests, the attendants seemed undisturbed to have in their midst all these soldiers and green-clad marshals from UNEPA. In fact, Roland saw one waiter smile when she thought no one was looking, and help herself to a glass of champagne.

UNEPA . . . Roland thought on spying the green uniforms. *That means eco-crimes.*

Wu hustled the squad past where some real soldiers stood guard in blurry combat camouflage, their eyes hooded by multi-sensor goggles which seemed to dart and flash as their pulse-rifles glittered darkly. The guards dismissed the recruits with barely a flicker of attention, which irked Roland far worse than the insults of Wu and Kleinerman.

I'll make them notice me, he vowed. Though he knew better than to expect it soon. You didn't get to be like those guys overnight.

Behind the mansion a ramp dropped steeply into the earth. Smoke rose from a blasted steel door that now lay curled and twisted to one side. A woman marshal met them by the opening. Even darker than her chocolate skin was the cast of her features—as if they were carved from basalt. “This way,” she said tersely and led them down the ramp—a trip of more than fifty meters—into a reinforced concrete bunker. When they reached the bottom however, it wasn't at all what Roland expected—some squat armored slab. Instead, he found himself in a place straight out of the *Arabian Nights*.

The recruits gasped. “Shee-it!” Takka commented concisely, showing how well he'd picked up the essentials of Military English. Kanakoa, the Hawaiian, expressed amazement even more eloquently. “Welcome to the Elephant's Graveyard, Tarzan.”

Roland only stared. Tiny, multicolored spotlights illuminated the arched chamber, subtly emphasizing the shine of ivory and fur and crystal. From wall to wall, the spoils of five continents were piled high. More illicit wealth than Roland had ever seen. More than he could ever have imagined.

From racks in all directions hung spotted leopard pelts, shimmering beaver skins, white winter fox stoles. And shoes! Endless stacks of them, made from dead reptiles obviously, though Roland couldn't begin to conceive which species had given its all for which pair.

“Hey, Senterius.” Takka nudged him in the ribs and Roland looked down where the Japanese recruit pointed.

Near his left foot lay a luxurious white carpet . . . the splayed form of a flayed polar bear whose snarling expression looked really angry. Roland jerked away from those glittering teeth, backing up until something pointy and hard rammed his spine. He whirled, only to goggle in amazement at a stack of elephant tusks, each bearing a golden tip guard.

“Gaia!” he breathed.

“You said it,” Kanakoa commented. “Boy, I'll bet Her Holy Nibs is completely pissed off over this.”

Roland wished he hadn't spoken the Earth Mother's name aloud. Hers wasn't really a soldierly faith, after all. But Kanakoa and Takka seemed as stunned as he was. “What is all this?” Takka asked, waving at the heaped stacks of animal remains. “Who in the world would want these things?”

Roland shrugged. “Used to be, rich folks liked to wear gnomish crap like this.”

Takka sneered. “I knew that. But why now? It is not just illegal. It's . . . it's—”

“Sick? Is that what you were going to say, private?”

They turned to see the UNEPA marshal standing close by, looking past them at the piled ivory. She couldn't be over forty years old, but right now the tendons in her neck were taut as bowstrings and she looked quite ancient.

“Come with me, I want to show you soldiers something.”

They followed her past cases filled with pinned, iridescent butterflies . . . with gorilla-hand ashtrays and stools made from

elephants' feet . . . with petrified wood and glittering coral that must have been stolen from nature preserves . . . all the way to the back wall of the artificial cave, where two truly immense tusks formed a standing arch. Tiger skins draped a shrine of sorts—a case crafted in dark hardwood and glass containing dozens of earthenware jars.

Roland saw veins pulse on the backs of her hands. The recruits fell mute, awed by such hatred as she radiated now. Nothing down here impressed them half as much.

Roland found the courage to ask. “What’s in the jars, Ma’am?”

Watching her face, he realized what an effort it took for her to speak right now, and found himself wondering if he’d ever be able to exert such mastery over his own body.

“Rhinoceros . . . horn,” she said hoarsely. “Powdered narwhal tusk . . . whale semen . . .”

Roland nodded. He’d heard of such things. Ancient legends held they could prolong life or heighten sexual prowess or drive women into writhing heat. And neither morality nor law nor scientific disproof deterred some men from chasing hope.

“So much. There must be a hundred kilos in there!” Takka commented. But he stepped back when the UNEPA official whirled to glare at him, her expression one of bleak despair.

“You don’t understand,” she whispered. “I hoped we’d find so much more.”

#

Roland soon discovered just what use recruits were on a mission like this.

Sure enough, he thought, resigned that he had only begun plumbing the depths of exhaustion the Peacekeeping Forces had in store for him. Hauling sixty-kilo tusks up the steep ramp, he and Private Schmidt knew they were important pieces in a well-tuned, highly efficient, rapid-deployment force whose worldwide duties stretched from pole to pole. Their part was less glamorous than the on-site inspectors prowling Siberia and Sinkiang and Wyoming, enforcing arms control pacts. Or the brave few keeping angry militias in Brazil and Argentina from each others’ throats. Or even the officers tagging and inventorying tonight’s booty. But after all, as Corporal Wu told them repeatedly, they also serve who only grunt and sweat.

Roland tried not to show any discomfort working with Schmidt. After all, the tall, skinny alpine boy hadn’t even been born yet when the Helvetian War laid waste to much of Central Europe, and anyway you couldn’t exactly choose your background. Roland made an effort to accept him as a native of “West Austria,” and forget the past.

One thing, Schmidt sure spoke English well. Better, in fact, than most of Roland’s old gang back in Bloomington.

“Where are they hauling this stuff?” his partner asked the pilot of one of the mini-zeps as they took a two-minute breather.

“They’ve got warehouses all over the world,” the Swedish non-com said. “If I told you about them, you wouldn’t believe me.”

“Try us,” Roland prompted.

The flier’s blue eyes seemed to look far away. “Take what you found in that tomb and multiply it a thousand fold.”

“Shee-it,” Schmidt sighed. “But . . .”

“Oh, some of this stuff here won’t go into storage. The ivory, for instance. They’ll implant label isotopes so each piece is chemically unique, then they’ll sell it. The Zoo Arks harvest elephant tusks nowadays anyway, as do the African parks, so the beasts won’t tear up trees or attract poachers. That policy came too late to save this fellow.” He patted the tusk beside him. “Alas.”

“But what about the other stuff? The furs. The shoes. All that powdered horn shit?”

The pilot shrugged. “Can’t sell it. That’d just legitimize wearing or using the stuff. Create demand, you see.

“Can’t destroy it, either. Could you burn billions worth of beautiful things?”

“Sometimes they take school groups through the warehouses, to show kids what real evil is. But mostly it all just sits there, piling up.”

The pilot looked left and right. “I do have a theory, though. I think I know the real reason for the warehouses.”

“Yes?” Roland and Schmidt leaned forward, ready to accept his confidence.

The pilot spoke behind a shielding hand. “*Aliens*. They’re going to sell it all to aliens from outer space.”

Roland groaned. Schmidt spat on the ground in disgust. Of course real soldiers were going to treat them this way. But it was embarrassing to have been sucked in so openly.

“You think I’m kidding?” the pilot asked.

“No, we think you’re crazy.”

That brought a wry grin. “Likely enough, boy. But think about it! It’s only a matter of time til we’re contacted, no? They’ve been searching the sky for a hundred years now. And we’ve been filling space with our radio and TV and Data-Net noise all that time. Sooner or later a starship has to stop by. It only makes sense, no?”

Roland decided the only safe reply was a silent stare. He watched the non-com warily.

“So I figure it’s like this. That starship is very likely to be a trading vessel . . . out on a long, long cruise, like those clipper ships of olden times. They’ll stop here and want to buy stuff, but not just any stuff. It will have to be light, portable, beautiful, and totally unique to Earth. Otherwise, why bother?”

“But this stuff’s dumpit contraband!” Roland said, pointing to the goods stacked in the cargo bay.

“Hey! You two! Break’s over!” It was Corporal Wu, calling from the ramp. He jerked his thumb, then swiveled and strode back into the catacomb. Roland and his partner stood up.

“But that’s the beauty of it!” the pilot continued, as if he hadn’t heard. “You see, the CITES rules make all these things illegal in order so there won’t be any economic market for killing endangered species.

“But fobbing it all on alien traders won’t create a market! It’s a one stop deal, you see? They come once, then they are gone again, forever. We empty the warehouses, and spend the profits buying up land for new game preserves.” He spread his hands as if to ask what could be more reasonable.

Schmidt spat again, muttering a curse in Schweitzer-Deutsch. “Come on Senterius, let’s go.” Roland followed quickly, glancing only once over his shoulder at the grinning pilot, wondering if the guy was crazy, brilliant, or simply a terrific sculptor of bullshit.

Probably all three, he figured at last, and double timed the rest of the way. After all, fairy tales were fairy tales, while Corporal Wu was palpable reality.

#

As he worked, Roland recalled the days not so long ago when he and his pals Remi and Crat used to sit in the park listening to old Joseph tell them about awful battles of the Helvetian War. The war that finally did end war.

Each of them reacted differently to Joseph’s eventual betrayal— Remi by turning tragically cynical, and Crat by declaring void anything spoken by anyone over thirty. To Roland, however, what lasted were the veteran’s tales of combat—of comrades fighting shoulder to shoulder, hauling each other through Swiss passes clogged with germ-laden, radioactive mud, struggling together to overcome a wily, desperate foe

Of course he didn’t actually wish for a real war to fight. Not a big one on the vast, impersonal scale the old vet described. He knew battle sounded a lot more attractive faraway, in stories, than it would be in person.

Still, was this to be the way of it from now on? Hauling off contraband seized from CITES violators? Manning tedious observer posts separating surly, bickering nations too poor and tired to fight anyway? Checking the bilges of rusting freighters for hidden caches of Flight Capital?

Oh, there were real warriors in the peacekeeping forces. Takka and some of the others might get to join the elite units quelling fierce little water wars like the one going on now in Ghana. But as an American he’d have little chance of joining any of the active units. The Guarantor Powers were still too big, too powerful. No little country would stand for Indian or American or Chinese troops stationed on their soil.

Well, at least I can learn how to be a warrior. I’ll be trained, ready, in case maybe the world ever needs me.

So he worked doggedly, doing as he was told. Hauling and lifting, lifting and hauling, Roland also tried to listen to UNEPA

officials, especially the dark woman. Had she really wished they found *more* of the grisly contraband?

“. . . thought we'd traced the Pretoria poaching ring all the way here," she said as he passed by, laden down with aromatic lion skins. "I figured we finally tracked down the main depot. But there's so little White Rhino powder, or—"

"Could Chang have already sold the rest?" One of the others asked.

She shook her head. "Chang's a hoarder. He only sells to maintain operating capital."

"Well, we'll find out when we finally catch him . . . the slippery eel."

Roland was still awed by the UNEPA woman, and a bit jealous. What was it like, he wondered, to care about something so passionately? He suspected it made her somehow more alive than he was.

According to the Recruitment Tapes, training was supposed to give him strong feelings of his own. Over months of exhaustion and discipline, he'd come to see his squad-mates as family. Closer than that. They would learn almost to read each others' thoughts, to depend on each other utterly, if necessary, to die for one another.

That was how it was supposed to work. Glancing at Takka and Schmidt and the other strangers in his squad, Roland wondered how the sergeants and instructors could accomplish such a thing. Frankly, it sounded awfully unlikely.

But hell, guys like Kleinerman and Wu have only been soldiering for five thousand years or so. I guess they know what they're doing.

How ironic then, that they finally made a science of soldiering at the very end, just as the profession tried hard to phase itself out of existence forever.

From the looks given them by the UNEPA marshals, that day would come none too soon. Necessity allied the two groups in a cause—that of saving the planet. But clearly the eco-officers would rather do without the military altogether.

Just be patient, Roland thought as he worked. We're doing the best we can, as fast as we can.

He and another recruit disassembled the shrine at the back of the cavernous treasure room, carefully unwinding snake-skin ropes binding the two huge archway tusks. They were lowering one of the ivory trophies to the floor when Roland's nostrils flared at a familiar smell. He stopped and sniffed.

"Come on," the Russian private groused in thick-accented Standard. "Now other one."

"Do you smell something?" Roland asked.

The other youth laughed. "I smell dead animals! What you think? It stink worse here than Tashkent brothels!"

But Roland shook his head. "That's not it." He turned left, following the scent.

Naturally, soldiers weren't allowed tobacco, which would sap their wind and stamina. But he'd been quite a smoker back in Indiana, puffing home-grown with Remi and Crat—as many as eight or ten hand-rolled cigs a week. Could a non-com or UNEPA be sneaking weed behind a corner? It had better not be a recruit, or there'd be latrine duty for the entire squad!

But no, there weren't any hiding places nearby. So where was it coming from?

Corporal Wu's whistle blew, signaling another short break. "Hey, Yank," the Russian said. "Don't be a *pizdyuk*. Come on."

Roland waved him to silence. He pushed aside one of the tiger skins, still sniffing, then crouched where he had first picked up the scent. It was strongest near the floor beside the glass case—now emptied of its brown jars of macabre powder. His fingers touched a warm breeze.

"Hey, give me a hand," he asked, bracing a shoulder against the wood. But the other recruit flipped two fingers as he walked away, muttering. "*Amerikanskee kakanee zassixa . . .*"

Roland checked his footing and strained. The heavy case rocked a bit before settling again.

This can't be right. The guy who owned this place wouldn't want to sweat. He'd never sweat.

Roland felt along the carved basework, working his way around to the back before finding what he sought—a spring-loaded catch. "Aha!" he said in a rush of real pleasure. With a click the entire case slid forward to jam against one of the huge, toppled tusks. Roland peered down steep stairs with a hint of light at the bottom.

He had to squeeze through the narrow opening. Tobacco aromas grew stronger as he descended quietly, carefully. Stooping under a low stone lintel, he entered a chamber hewn from naked rock. Roland straightened and pursed his lips in a silent whistle.

While this hiding place lacked the first one's air of elegant decadence, it did conceal the devil's own treasure . . . shelves stacked high with jars and small, bulging, plastic bags. "Hot damn," he said, fingering one of the bags. Gritty white powder sifted under a gilt-numbered label adorned with images of unicorns and dragons, though Roland knew the real donor must have been some poor, dumb, mostly-blind rhino in southern Africa, or another equally unprepossessing beast.

"It's the freaking jackpot," he said to himself. It was definitely time to report this. But as he turned to head back upstairs, a voice suddenly stopped him.

"Do not move, soldier-fellow. Hands up or I will shoot you dead."

Roland rotated slowly and saw what he'd missed in his first, cursory scan of the room. At about waist level, near a smoldering ashtray in the corner of the left wall, some of the shelving had swung aside to reveal a narrow tunnel. From this opening a middle-aged man with Taiwanese features aimed a machine pistol at him.

"Do you doubt I can hit you from here?" the man asked levelly. "Is that why you don't raise your hands as I command? I assure you, I'm an expert shooter. I've killed lions, tigers, at close range. Do you doubt it?"

"No. I believe you."

"Then comply! Or I will shoot!"

Roland felt sure the fellow meant it. But it seemed this was time for one of those inconvenient waves of obstinacy his friends used to chide him for, which used to get him into such trouble back in home.

"You shoot, and they'll hear you upstairs."

The man in the tunnel considered this. "Perhaps. On the other hand, if you were to attack me, or flee or call for help, the threat would be immediate and I would have to kill you at once."

Roland shrugged. "I ain't goin' nowhere."

"So. A standoff, then. All right, soldier. You may keep your hands down, as I see you're unarmed. But step back to that wall, or I will consider you dangerous and act accordingly!"

Roland did as he was told, watching for an opportunity. But the man crawled out of the tunnel and stood up without wavering his aim once. "My name is Chang," he said as he wiped his brow with a silk handkerchief.

"So I heard. You been a busy guy, Mr. Chang."

Those brown eyes squinted in amusement. "That I have, young soldier boy. What I've done and seen, you could not imagine. Even in these days of snoops and busy-bodies, I've kept secrets. Secrets deeper than even the Helvetian Gnomes had."

No doubt this was meant to impress Roland. It did. But he'd be damned if he'd give the bastard any satisfaction. "So what do we do now?"

Chang seemed to inspect him. "Now it's customary for me to bribe you. You must know I can offer you wealth and power. This tunnel bears a floater trolley on silent rails. If you help me take away my treasure, it could begin a long, profitable relationship."

Roland felt the piercing intensity of the man's scrutiny. After a moment's thought, he shrugged. "Sure, why not?"

Now it was Chang's turn to pause. Then he giggled. "Ah! I do enjoy encountering wit. Obviously you know I am lying, that I'd kill you once we reached the other end. And I, in turn, can tell you have more urgent goals than money. Is it honor you seek, perhaps?"

Again, Roland shrugged. He wouldn't have put it quite that way.

"So, again we have a stand-off. Hence my second proposition. You help me load my trolley, at gunpoint. I will then depart, and let you live."

This time Roland's pause was calculated only to delay. "How do I know . . ."

"No questions! Obviously I can't turn my back on you. Agree or die now. Begin with the bags on the shelf by your shoulder, or I'll shoot and be gone before others can come!"

Roland slowly turned and picked up two of the bags, one in each hand.

The "trolley" did indeed float just a few millimeters above a pair of gleaming rails, stretching off into interminable darkness. Roland had no doubt it was meant for swift escape, nor that Chang would be long gone by the time UNEPA traced the other end. The guy seemed to have thought of everything.

He tried to carry as little as he could each trip. Chang lit a cigarette and fumed, watching him like a cat as Roland leaned over the tiny passenger's pallet to lay his loads in the trolley's capacious cargo hamper.

Roland's experience with babushkas and grempers back in Indiana helped, for he seemed to know by instinct how to just brush the inside edge of provocation. Once, he fumbled one of the clay jars. It hit hard and trickled powder onto the tunnel floor, crackling where bits struck the silvery rails. Chang hissed and the knuckles of his hand whitened on the pistol grip. Still, Roland figured the geep wouldn't shoot him just yet. He'd do it at the last moment, probably when the trolley was ready to go.

"Hurry up!" the Han millionaire spat. "You move like an American!"

That gave Roland an excuse to turn and grin at the man. "How'd you guess?" he asked, slowing things another few seconds, stretching Chang's patience before grabbing two more jars and resuming work.

Chang kept glancing up the stairs, obviously listening . . . but never letting his attention waver long enough to give Roland any foolish notions.

You should've reported the secret passage the minute you found it, Roland thought, cursing inwardly. Unfortunately, the opening was behind the display case, and who knew when it would be discovered? Too late for Private Roland Senterius, probably.

The look in Chang's calculating eyes made Roland reconsider the scenario. He knows that I know I'll have to jump him, just before the end.

What's more, he knows that I know that he knows.

That meant Chang would shoot him before the last moment, to prevent that desperate lunge. But how soon before?

Not too soon, or the smuggler would have to depart with a half-empty trolley, abandoning the rest of his hoard forever. Clearly, Chang's profound greed was the one thing keeping Roland alive. Still, he'd have to do it before the cargo hamper was topped off . . . before Roland's adrenaline was pumping for the maximum, all-or-nothing effort.

Five loads to go, Roland thought while fitting more jars snugly into place under Chang's watchful eye. *Will he do it at three? Or two?*

He was delivering the next load, beginning to screw up his courage, when a noise echoed down the steep stair-shaft, preempting all plans.

"Senterius! It's Kanakoa. And Schmidt. What the hell are you doing down here?"

Roland froze. Chang edged against the wall near the steps, watching him. There came the scrape of footsteps on stone.

Dumpit, Roland cursed. He was bent over the trolley in an awkward position, much too far away to attack Chang with any chance of success. In addition, his hands were laden with bags. If only he were carrying jars, that could be thrown . . .

"Senterius? What are you doing, asshole? Smoking? Kleinerman'll roast all of us if they catch you!"

Roland suddenly realized why Chang was watching him so intently. Chang's following my eyes!

Roland's gaze could not help widening when one booted foot appeared on the topmost visible step. Chang was using him to gauge where the other recruits were, to tell when the right moment was just right for killing all three of them! In holding onto seconds of life, Roland knew suddenly, horribly, he was murdering Kanakoa and Schmidt.

Still, even knowing that, he remained statue-like. In Chang's eyes he saw understanding and the glitter of contemptuous

victory. How did he know? Roland railed inside. How did he know I was a coward?

The admission belied every one of his dreams. It betrayed what Roland had thought were his reasons for living. The realization seared so hot it tore through his rigor and burst forth in a sudden scream.

“Cover!” he cried, and threw himself onto the pallet, slamming home the trolley’s single lever. Almost simultaneously a series of rapid bangs rattled the narrow chamber and Roland’s leg erupted in sudden agony. Then came blackness and a swift whistle of wind as the little car sped into a gloom darker than any he had ever known.

Seconds ticked while he battled fiery pain. Clenching his jaw to keep from moaning, Roland desperately hauled back on the lever, bringing the trolley to a jerky halt in the middle of the arrow-straight shaft. Waves of dizziness almost overwhelmed him as he rolled over onto his back and clutched his thigh, feeling a sickening, sticky wetness there.

One thing for certain, he couldn’t afford the luxury of fainting here. Funny—he’d been taught all that bio-feedback stuff in school, and drilled in it again here in training. But right now he just couldn’t spare the time to use any of those techniques, not even to stop the pain!

“There are two types of simple thigh wounds,” memorized words droned as he wrestled the belt from his waist. “One, a straight puncture of muscle fiber, is quite manageable. Treat it quickly and move on. Your comrade should be able to offer covering fire, even if he can no longer move.

“The other kind is much more dangerous . . . ”

Roland fought shivers as he looped the belt above the wound. He had no idea which type it was. If Chang had hit the femoral artery, this makeshift tourniquet wasn’t going to do much good.

He grunted and yanked hard, cinching the belt as tight as he could, then slumped back in reaction and exhaustion.

You did it! He told himself. You beat the bastard!

Roland tried to feel elated. Even if he was now bleeding to death, he’d certainly won more minutes than Chang intended giving him. More important still, Chang was brought down! In stealing the smuggling lord’s only means of escape, Roland ensured his capture!

Then why do I feel so rotten?

In fantasy Roland had often visualized being wounded, even dying in battle. Always though, he had imagined there’d be some solace, if only a soldier’s final condolence of victory.

So why did he feel so dirty now? So ashamed?

He was alive now because he’d done the unexpected. Chang had been looking for heroism or cowardice—a berserker attack or animal rigor.

But in that moment of impulse Roland had remembered the words of the old Vet in Bloomington. “A fool who wants to live will do anything his captor tells him. He’ll stand perfectly still just to win a few more heartbeats. Or he may burst into a useless charge. That’s when, sometimes, it takes the most guts to retreat in good order, to fight another day.”

Yeah Joseph, sure. Roland thought. *Tell me about it.*

As his heart rate eased and the panting subsided, he now heard what sounded like moans coming down the tunnel. Kanakoa or Schmidt, or both. Wounded. Perhaps dying.

What good would I have done by staying? Instead of a leg wound, he’d have gone down with several bullets in the heart or face . . . and Chang would have gotten away.

True enough, but that didn’t seem to help. Nor did reminding himself that neither of those guys back there were really his friends, anyway.

“Soldier boy!” The shout echoed down the narrow passage. “Bring the trolley back or I’ll shoot you now!”

“Fat chance,” Roland muttered. And even Chang’s voice carried little conviction. Straight as the tunnel was, and allowing for ricochets, the odds of hitting him were low even for an expert. Anyway, what good was a threat, when to comply meant certain death?

It wasn't repeated. For all the millionaire knew Roland was already at the other end.

"Why did I stop?" Roland asked aloud, softly. At the terminus he might find a telephone to call an ambulance, instead of lying here possibly bleeding to death.

A wave of agony throbbed up his leg. "And I thought I was so smart, not becoming a dazer . . ." If he'd ever slipped over that line— tripping on self-stimulated endorphins—he'd certainly have a skill appropriate for here and now! What would have been self-abuse in Indiana would be right-on First Aid at a time like this.

But then again, if he'd ever been a dazer, he wouldn't even be here right now. The Corps didn't accept addicts.

Suddenly the cavern erupted in thunder, reverberating the very walls. Roland covered his ears, recognizing pulse-rifle fire. No doubt about it—real soldiers had arrived at last.

The gunshots ended almost immediately. *Could it be over already?* he wondered.

But no. As the ringing echoes subsided, he heard voices. One of them Chang's.

". . . if you throw down grenades. So if you want your wounded soldiers to live, negotiate with me!"

So Chang claimed two captives. Roland realized gloomily that both Schmidt and Kanakoa must have been caught, despite his shouted warning.

Or maybe not! After all, would Chang admit to having let one recruit escape down the tunnel? Perhaps he only had one of the others and used the plural form as a ploy. Roland clung to that hope.

It took a while for someone in authority to begin negotiations. The officer's voice was too muffled for Roland to make out, but he heard Chang's side of the exchange.

"Not good enough! Prison would be the same as death for me! I accept nothing more rigorous than house arrest on my Pingtung estate

"Yes, naturally I will turn state's evidence. I owe my associates nothing. But I must have the deal sealed by a magistrate, at once!"

Again, the officials' words were indistinct. But Roland caught tones of prevarication.

"Stop delaying! The alternative is death for these young soldiers!" Chang shouted back.

"Yes, yes, of course they can have medical attention . . . after I get my plea bargain! Properly sealed! Meanwhile, any sign of a stun or concussion grenade and I shoot them in the head, then myself!"

Roland could tell the marshals were weakening, probably under pressure from the Peacekeeper C.O. Damn! he thought. The good guys' victory would be compromised. Worse, Chang surely had means at his estate for another escape, even from state detention.

Don't give in, he mentally urged the officers, though he felt pangs thinking of Kanakoa, or even Schmidt, lying there dying. If you plea bargain, the bastard'll just start all over again.

But Chang's next shout carried a tone of satisfaction. "That's better! I can accept that. You better hurry with the document though. These men do not look well."

Roland cursed. "No!"

He rolled over and reached into the cargo hamper, tossing bags and jars onto the tracks ahead. They split and shattered. Narwhal tusks and rhino horns coated the tracks in powdered form, obstructing further travel in that direction. Whatever happened, there'd be no getaway for Chang.

Then Roland fought fresh waves of nausea as he writhed to turn around on the narrow trolley, facing the direction he had come.

He'd worried he might have to manipulate the lever with his feet. But there was a duplicate at the other end. A red tag prevented the switch from being pushed passed a certain point. This Roland tore out, ripping one of his fingers in the process.

"Yes, I am willing to have my house arrest fully monitored by cameras at all times"

“I’m sure you are, carni-man,” Roland muttered. “But you don’t fool me.”

He slammed the lever home and the trolley glided forward. What began as a gentle breeze soon was a hurricane as power flowed from the humming rails.

You forget, Chang, that your estate is still on Mother Earth. And my guess is that Mom’s had just about enough of you by now . . .

The light ahead ballooned in a rapidly expanding circle of brilliance. Roland felt safety solenoids try to throw the lever back but he strained, holding it in place. In an instant of telescoped time, he saw a figure turn in the light, stare down the shaft, raise his weapon . . .

“Gaia!” Roland screamed, a battle cry chosen at the last second out of some unknown recess of faith as he hurtled like a missile into space.

#

It was a mess the UNEPA team came down to inspect, after Peacekeeping personnel pronounced it safe. And once the wounded boy had been rushed off to hospital. They were still taking pictures of the two remaining bodies when green-clad Ecology Department officials came down the steep stairs at last, to see what had happened.

“Well, here’s your missing cache, Elena,” one of them said, picking carefully through the white and gray powders scattered across the floor. Three walls of shelves were intact, but a fourth had collapsed over two quiet forms, sprawled atop each other in the corner. There, the snowdrifts had been stained crimson.

“Damn,” the UNEPA man continued, shaking his head. “A lot of poor beasts died for one geep’s fetish.”

Elena looked down at her enemy of all these years. Chang’s mouth gaped open—crammed full of powder which trailed off to the limp hand of the young recruit she had spoken to early in the evening. Even dying, riddled with bullets, this soldier apparently had a sense of symmetry, of poetry.

A Peacekeeping Forces non-com sat near the boy smoothing a lock of ruffled hair. The corporal looked up at Elena.

“Senterius was a lousy shot. Never showed any promise at all with weapons. Guess he improvised though. He graduated.”

Elena turned away, disgusted by the maudlin, adolescent sentiment. *Warriors*, she thought. *The world is finally growing up though. Someday soon we’ll be well rid of them at last.*

Still, why was it she all of a sudden felt as if she had walked into a temple? Or that the spirits of all the martyred creatures were holding silent, reverent watch right now, along with the mourning corporal?

It was another woman’s low voice Elena seemed to hear then, so briefly it was all too easy to dismiss as an echo, or a momentary figment of exhaustion. Still, she briefly closed her eyes and swayed.

“*There will be an end to war;*” the voice seemed to say, with gentle patience.

“*But there will always be a need for heroes.*”

Excerpted from David Brin’s 1990 novel *Earth*.





“North Shore Mujahideen” Graffiti

designed by Sam Cole

Another Day of Infamy

by Ashley Henley

Yesterday, December 7, 2041, egregious acts of terrorism by the Federation Alliance of Socialist, Communist, and Islamic State Members against the United States of America marked the beginning of a new chapter in the history of the modern world. The story being written as we speak is one of the renewal of American resolve in its role as the exemplary leader and champion of free republics around the globe.

As the Federation Alliance of Socialist, Communist, and Islamic State Members (F.A.S.C.I.S.M.) consciously infiltrated and discriminately dismantled our nation's key electronic infrastructure sites under the guise of a rogue hacker nation, the Cyber Terrorism Division of our nation's Central Intelligence Agency concurrently identified the true identity of our attackers, thus necessitating the immediate implementation of our nation's constitutionally prescribed course of action.

As Commander in Chief of our nation's military and the elected leader of this great nation, working in conjunction with our Cyber Terrorism Division, I established a direct line of communication with the current overlord of F.A.S.C.I.S.M. in order to extend an "olive branch" and send our request for immediate shutdown of the dismantling operations exposed by our Cyber Terrorism Division.

A clear declaration of our nation's position to maintain peaceful and cooperative relations with the Federation was drafted and delivered to the current overlord and to each of the six leaders of the Federation nations, with clearly specified routes to immediately restore peaceful relations and halt the ensuing American military response, as well as detailed consequences as required by the Twenty-Eighth and Twenty-Ninth Amendments to our Constitution, collectively known as our Terrorism Response Plan, if they chose to ignore our national sovereignty and existence as a free nation.

As we approach the closing minutes of our twenty-four-hour "olive branch" to the members of the Federation Alliance, our electronic infrastructure remains unrestored and no member has given a response. So it is with unwavering dedication to the values and freedoms of our great nation and my duty as President of these United States of America to ask the American people to support my decision to immediately initiate targeted, simultaneous "lightning strikes" against key infrastructure, both electronic and otherwise, against all members of the Federation and demand Congress to approve an Official Declaration of War between the United States of America and the Federation Alliance of Socialist, Communist, and Islamic State Members.

To all citizens of our beloved nation: Now is not a time for panic or fear. Rest assured that we, the greatest nation in the history of modern civilization, have already begun our recovery process and are secure in our ability to fully restore our electronic infrastructure. I ask for your confidence in our nation's enduring strength, your understanding and willingness to adapt to our current circumstances, and your commitment to make the necessary sacrifices in the coming days. As we write our new history, let us fill the pages with our unending strength and conviction, our unfaltering faith, and with the ever-enduring American spirit that will continue to inspire all future generations until the end of time. God Bless the United States of America.



Artist and Author Bios

Martin Dempsey (Foreword) served as the 18th Chairman of the Joint Chiefs of Staff, the highest-ranking military officer in the U.S. Armed Forces and the principal military advisor to the President, the Secretary of Defense, and the National Security Council. Prior to becoming Chairman, he served as the U.S. Army's 37th Chief of Staff.

General Dempsey graduated from West Point in 1974 and he holds a master's degree in English from Duke University. During his 41 years of service in uniform, he commanded at every echelon, from platoon to combatant command, across the

United States and the globe.

Alec Meden (From a Remove) is a twenty-year old junior at Chapman University, studying screenwriting and creative writing. He is an Eagle Scout, outdoor enthusiast, and an avid reader. He has had an intense interest in military affairs and science fiction from a young age. His story won the project's war-art challenge exploring conflict in space at the end of the 21st Century.

Ken Liu (Article 1, Section 8, Clause 11) is an author and translator of speculative fiction, as well as a lawyer and programmer. A winner of the Nebula, Hugo, and World Fantasy Awards, he has been published in the *Magazine of Fantasy & Science Fiction*, *Asimov's*, *Analog*, *Clarkesworld*, *Lightspeed*, and *Strange Horizons*, among other places. He lives with his family near Boston, Massachusetts. Ken's debut novel, *The Grace of Kings*, the first in a silkpunk epic fantasy series, was published by Saga Press in April 2015. Saga will also publish a collection of his short stories, *The Paper Menagerie and Other Stories*, in March 2016. His website is <http://kenliu.name>.

Madeline Ashby (A Stopped Clock) is a futurist, science fiction novelist, and columnist living in Toronto. She has worked with organizations like Intel Labs, the Institute for the Future, SciFutures, Data & Society, Nesta, and others. She is the author of the Machine Dynasty series of novels from Angry Robot Books. Her novel *Company Town*, about the future of work, energy, and smart cities, will be available from Tor Books in 2016. She tweets @MadelineAshby, and her website is madelineashby.com.

Alex Brady (Big and Noisy) has been a concept artist working in the entertainment industry for five years and a fanatical science fiction enthusiast for twenty-five years. Coming from a background in automotive design Alex now works as a freelancer for clients including Visceral Games, Moving Picture Company, Autodesk, and JaguarLandrover. Brady's image was selected from the project's war-art challenge calling for visual art about the future of urban warfare in megacities.

Jamie Metzl (A Visit to Weizenbaum) is the author of the novels *Genesis Code* and *The Depths of the Sea* and of a history of the Cambodian genocide. He is Chief Strategy Officer of the biotechnology company ORIG3N and a Senior Fellow for Technology and National Security at the Atlantic Council. His past positions include Executive Vice President of the Asia Society, Deputy Staff Director of the US Senate Foreign Relations Committee, Senior Coordinator for International Public Information at the Department of State, and Director for Multilateral and Humanitarian Affairs on the National Security Council. His writing on Asian affairs, genetics, virtual reality, and other topics has been featured in the *New York Times*, *Foreign Affairs*, and other publications. He holds a PhD in Southeast Asian history from Oxford University and a juris doctorate from Harvard Law School. His website is www.jamiemetzl.com. Readers of "A Visit to Weizenbaum" wanting background on how the characters' names were determined can see this link for Weizenbaum/Elizabeth and this link for Galatin.

August Cole (ANTFARM) is an author and analyst specializing in national security issues. He is a Nonresident Senior Fellow at the Atlantic Council's Brent Scowcroft Center on International Security. He is the Director of the Council's Art of Future Warfare project, which explores narrative fiction and visual media for insight into the future of conflict. From 2007 to 2010, Cole reported on the defense industry for the *Wall Street Journal*. His fiction writing tackles themes at the core of American foreign policy and national security in the twenty-first century. His first book *Ghost Fleet: A Novel of the Next World War* is a collaborative novel written with Peter W. Singer. He collaborated with Adam Proia, a studio manager at a Boston-area advertising agency, on the "49/50" image in Sam Cole's "North Shore Mujahideen" poster. His website is www.augustcole.com.

Mathew Burrows (The Exception That Proves the Rule) serves as Director of the Atlantic Council's Strategic Foresight Initiative. His recent book is entitled *The Future Declassified: Megatrends that Will Undo the World Unless We Take Action*.

In August 2013, he retired from a twenty-eight-year career in the CIA and State Department, the last ten being spent at the National Intelligence Council (NIC), the premier analytic unit in the US intelligence community. In 2007, he was appointed Counselor, which is the number three position in the NIC and was responsible for managing a staff of senior analysts and production technicians who guide and shepherd all NIC products from inception to dissemination. He was the principal drafter for the NIC publication *Global Trends 2030: Alternative Worlds*. He also drafted two earlier editions of that report. These reports, forecasting global trends and highlighting possible scenarios for the next fifteen to twenty years, help incoming Presidents and their senior foreign policy teams undertake strategic reviews of US policies.

Linda Nagata (Codename: Delphi) is an award-winning writer best known for her high-tech, “hard” science fiction. Her story “Codename: Delphi” was originally published in *Lightspeed Magazine* and was included in *The Year’s Best Military SF & Space Opera*. Her novel, *The Red*, set in the same story world, is a near-future military thriller that was a finalist for both the Nebula and John W. Campbell Memorial awards. Her website is MythicIsland.com.

Nikolas Katsimpras (Coffee, Wi-Fi and the Moon) is a Senior Fellow of the Hellenic American Leadership Council and a lecturer at Columbia University’s Negotiation and Conflict Resolution program. A former officer of the Hellenic Navy with extensive international experience, Katsimpras has been awarded by the International Institute for Humanitarian Law, and in 2012, he received the Dynamical Systems Fellowship from Columbia University’s Advanced Consortium on Cooperation, Conflict, and Complexity (AC4) to conduct research on the peace negotiations in Burma. Katsimpras has an MS in Negotiation and Conflict Resolution from Columbia University and a BS from the Hellenic Naval Academy. “Coffee, Wi-Fi and the Moon” won the project’s war-art challenge that sought short stories about the outbreak of a great-power war.

David Brin (A Need for Heroes) is a scientist, best-selling author, astronomer and tech-futurist. His novels include *Earth*, *The Postman* and Hugo Award winners *Startide Rising* and *The Uplift War*. A leading commentator and speaker on modern trends, his nonfiction book *The Transparent Society* won the Freedom of Speech Award of the American Library Association. Brin’s newest novel *EXISTENCE* explores the ultimate question: billions of planets are ripe for life. So where is Everybody? David’s main thread: how will we shape the days and years ahead—and how will tomorrow shape us? His website is www.davidbrin.com.

Ashley Henley (A Day of Infamy), a Mississippi public school teacher for the past thirteen years, was born in Joplin, Missouri in the dawn of the Reagan era. Ashley married her high school sweetheart a mere month before he deployed to serve in Operation Iraqi Freedom. While her husband was serving on active duty, Ashley completed her master’s of arts in education with a concentration in Constitutional History at the University of Mississippi through a fellowship awarded to her by the James Madison Memorial Fellowship Foundation. Ashley is currently the Gifted Education teacher at Walls Elementary in DeSoto County, Mississippi and a Republican nominee for the Mississippi House of Representatives. Henley’s presidential address won the project’s war-art challenge that called for a presidential address after the “next Pearl Harbor” in the year 2041.

EG Douglas (Win the Peace) is a Freelance Writer based in Scotland. A graduate from the University of Glasgow in both Aerospace Engineering and War Studies, EG applies those same skillsets to his writing when he isn’t challenging his imagination through disparate hobbies. He especially enjoys considering the speculative nature of science fiction and how it can shape the development of technology and society. You can find him at <https://theexilesatelier.wordpress.com/>.

Spiros Karkavelas (cover art) is a freelance concept artist based in Greece. Never liking to spend too much time in one place, he travels the world (preferably on a motorcycle) as much as possible. As an artist, he tries to bring as much of his experiences into his pieces, creating work that, while mostly fictional and for entertainment purposes, can be traced back to the real world. Spiros has worked with the film and videogame industry since 2013.

Sam Cole (“North Shore Mujahideen” image) is a filmmaker based in Brooklyn. Cole codirected and shot *Danchi No Yume—Dreams of the Projects*, a feature documentary about Japanese hip-hop icon Anarchy. His website is www.samcole2020.com.



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About the Brent Scowcroft Center on International Security

The Atlantic Council’s flagship International Security Program was relaunched as the Brent Scowcroft Center on International Security in September 2012. The transatlantic partnership remains at the core of the Scowcroft Center’s analysis of how global trends and emerging security challenges will impact the United States, its allies, and global partners. The Scowcroft Center aims to produce cutting-edge analyses and to develop strategies for how the United States can best work with like-minded countries to shape the future.

The Scowcroft Center works collaboratively with the Council’s other regional and functional programs and centers to produce multi-disciplinary analyses. The Center honors General Brent Scowcroft’s legacy of service and embodies his ethos of non-partisan commitment to the cause of international security, support for US international leadership in cooperation with allies and partners, and legacy of mentorship to the next generation of leaders.

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About the Art of Future Warfare Project

The Atlantic Council's Art of Future Warfare project is driven by the Scowcroft Center on International Security's mandate to advance thinking and planning for the future of warfare. The project's core mission is to cultivate a community of interest in works and ideas arising from the intersection of creativity and expectations about how emerging antagonists, disruptive technologies, and novel warfighting concepts may animate tomorrow's conflicts.

www.artoffuturewarfare.org

