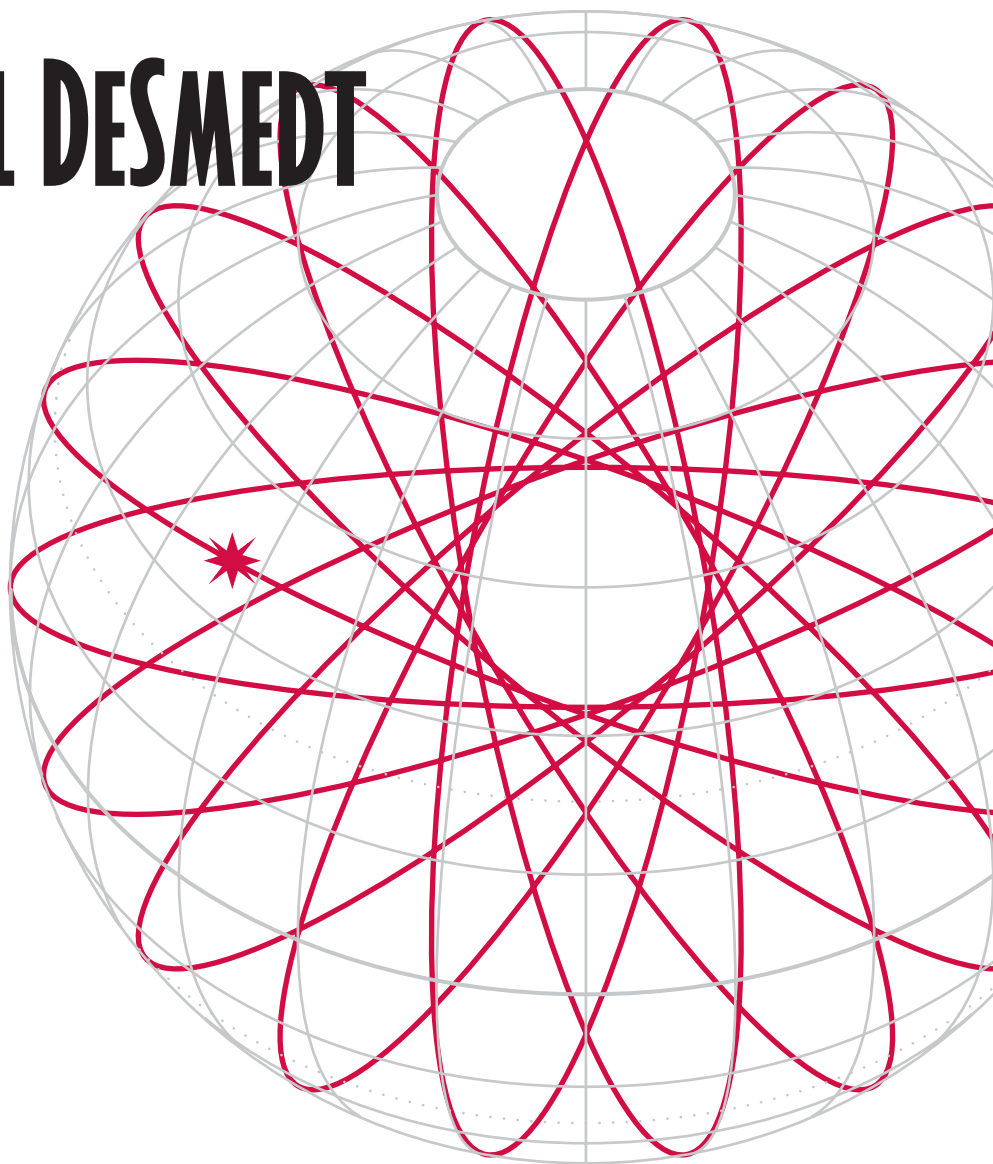


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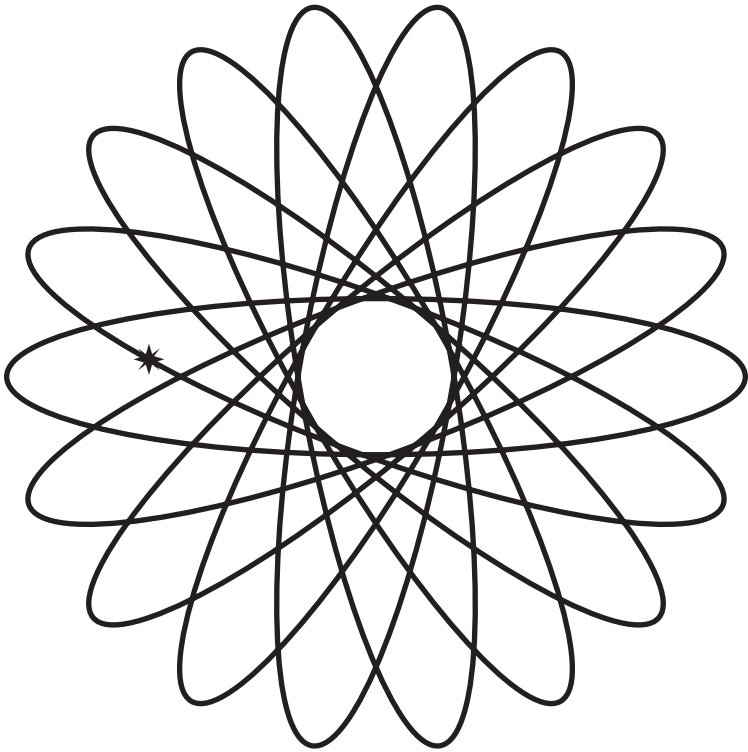


**SINGULARITY**

# SINGULARITY



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**BILL DESMEDT**

*per Aspera*  
SEATTLE, WASHINGTON

This book is a work of fiction. The characters, incidents, and dialogue are drawn from the author's imagination and are not to be construed as real. Any resemblance to actual events or persons, living or dead, is entirely coincidental.

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For Ted DeSmedt  
friend, father, ancient mariner

— *'Tis not too late to seek a newer world*



# Introduction

# The Tunguska Event

*Suddenly the sky split in two, and high and wide above the forest the whole north of the sky was covered with fire.*

— S.B. SEMYONOV, EYEWITNESS

**T**HE REMNANT HAD sailed the empty spaces between the stars since time began. Had journeyed far, far in space and time from its birth at the beginning of all things, far from its forging in the primal fires of Creation.

There was no destination on this voyage, though there were occasional ports of call. Here and there throughout the void tiny orbs circled their parent primaries, huddled close against the cold and the dark. Most such solar systems were bypassed without incident. Still, every once in an eternity, some unlucky world would chance to swim out into the remnant's path.

As one is doing now.

In this, the summer of 1908, there is no science or technology anywhere on earth that might avert the impending catastrophe. Heavier-than-air flying machines have only just begun their conquest of the skies, and space flight remains but a distant dream, the exclusive province of visionaries like Jules Verne and Herbert George Wells. The controversial theory that the entire physical world might be made up of

tiny particles called “atoms” is still waging an uphill battle for scientific acceptance, against the strenuous opposition of influential physicist-philosopher Ernst Mach. It will be another fifteen months before a young Albert Einstein will leave his safe berth at the Bern patent office and devote himself fulltime to generalizing the theory of relativity he first broached a mere three years earlier. For all the secrets that nature has yielded up in the two centuries since Newton, the scientists of Earth still stand helpless before the threat posed by the remnant.

But they can, just barely, detect its approach.

In the main physics lab at Germany’s Kiel University of Applied Science, beginning at six in the evening on June 27<sup>th</sup> and continuing over the following two nights, Professor Ludwig Weber has been observing faint but regular disturbances in his magnetometer readings. After ruling out streetcar vibrations and Northern Lights, he concludes that a powerful magnetic point-source must be nearing the Earth from somewhere out in space. But when Weber points the observatory telescope at the likely region of night sky, he sees — nothing.

What could be close enough and charged enough to interfere with the magnetic field of the Earth itself, yet remain invisible to the most sensitive instruments early twentieth-century optical technology can muster? This is the question that confounds Weber throughout the evening of June 29<sup>th</sup> as he watches the magnetic disturbances grow in strength. He is still wrestling with the riddle when, at 1:14 on the morning of June 30, 1908, the frenetic jitter of his magnetometer needle comes to a sudden dead stop.

Six time zones to the east of Kiel, far out on the Central Siberian plateau, there yawns that vast, silent emptiness known as the Stony Tunguska basin — three hundred thousand square miles of watershed, peopled, even in this eighth year of the new century, by fewer than thirty thousand souls. Here, in this land of expatriate Russian frontiersmen and nomadic Evenki tribes, there are no telescopes, no magnetometers, precious little technology of any kind. Here in Tunguska, nothing but a dying shaman’s vision has foretold the remnant’s coming, and nothing more than the naked eye will be needed to witness its arrival.



Here in Tunguska, the morning of June 30<sup>th</sup> has dawned bright and clear, scarcely a wisp of cloud in the sky. By seven, the sun has been up for hours, banishing the chill of the brief subarctic summer night, promising another sweltering noontide. Herds of domesticated reindeer, lifeblood of the Evenki nomads, are already grazing on new shoots in the thickly-forested taiga. Dense veils of mosquitoes swarm the pestilential bogs of the Great Southern Swamp. The living world goes on unchanged, just as it has for centuries. Despite the shaman's warning.

Perhaps no one finds more comfort in the very ordinariness of this fine summer morning than a young Evenki herdsman by the name of Vasily Jenkoul. For today Jenkoul must tend to his father's southern herds. And that will mean riding down the long Silgami ridge, directly into the Tunguska heartlands.

Into the lands where — to believe the shaman's deathbed prophecy — on this morning, the great god Ogdy, Old Man of the Storms, will send forth his thunderwinged minions to visit death and destruction upon the clans of the Stony Tunguska.

7:14 A.M. The forest falls silent. Even the ceaseless susurrations of the Great Swamp's insect life fades. Far off in the southeastern skies, clearly visible in broad daylight, a bright blue star appears.

The remnant is close now. Four hundred miles out and a hundred miles up, just beginning to brush the lower edges of the ionosphere. The resulting shockwave fluoresces in the ultraviolet. Thickening atmosphere absorbs the radiation and re-emits it at longer wavelengths. Trailing a plasma column of cerulean blue, it descends.

Scattered outposts throughout the sparsely-inhabited Tunguska region awaken to a cannonade of sonic booms echoing down from the cloudless sky. Villagers pour into the streets to watch in amazement as a blindingly bright blue "pipe" bisects the heavens. Old women burst into tears, crying that the end of the world has come.

Fifty-seven miles southwest of ground zero, on the outskirts of a ramshackle of sod-roofed wooden huts that styles itself the Vanavara Trading Station, Semyon Borisovich Semyonov is sitting on his porch, trying to tamp a new hoop onto a cask of flour using nothing more serviceable than an axe. Nothing to be done for it; out here on the taiga

one learns to make do with what is to hand. “If you have no plow, you must furrow with a stick,” as the Siberians say.

He fumbles the hoop into position. There. He is just raising the axe for a final blow, when the sky brightens directly overhead.

Semyon arrests the axe in mid-swing and looks up. The sky—the sky splits in two! A broad streak of impossibly brilliant blue cleaves it from south to north. Semyon clambers to his feet. As he watches, the blue line touches the horizon.

The closest human being to the event this summer morning is not Semyon, but a young Evenki herdsman. Yet, with his view of the heavens obscured by dense forest canopy, Jenkoul is the last to see it coming. Nor, even in this eerie silence, will he hear the rumble of its approach, for the remnant’s speed far exceeds that of sound. No warning will have a chance to reach his senses, before—

*Impact!*

A patch of sky framed by the empty arms of a blighted birch suddenly flares blue-white. Jenkoul reins to a halt, begins to dismount, and is nearly thrown from the saddle as the first in a series of thunderous concussions hits him.

*Ogdy!* The Old Man of the Thunder has unleashed his terrible winged minions against the clans. Peal after peal deafens Jenkoul, as all around him ancient stands of larch and pine crash to the ground, uprooted and smashed flat by the hurricane-force blast wave. Beyond toppling trees, a mountains-high tongue of flame reaches up.

Ogdy is kindling his lodge-fire in the heartlands of the Stony Tunguska.

Only the lore of the Evenki saves Jenkoul now. It is said a hunter caught in the open by a blizzard can survive by hunkering down alongside his mount, using its body as a shield against gale-force winds. Perhaps this will work for fire as well as ice. Jenkoul yanks his steed to the ground and cramps into the lee of its torso. The thunder is one continuous roar. Jenkoul exhales and holds his breath, lest his lungs be seared by the superheated air now washing over him.

Fifty-seven miles away, at Vanavara Station, Semyon’s axe clatters to the floor. His eyes squeeze shut against a flash too bright to look

at. The northern half of the sky erupts in flame. The sky has split open, and, in opening, has disclosed not the heavens, but the fires of hell.

Semyon opens his mouth to call out. A monster wind stirs the trees. Suddenly he is running off the porch, tearing at his clothes. His shirt is smoking, so hot it burns his skin. As Semyon clears the stoop, the blast wave hits. It picks him up and flings him like a rag doll all the way across the yard. Fissures open in the ground around him. Flat on his back now, it is all he can do to throw an arm across his face and block out the sight of the hideous sky.

Directly above ground zero a pillar of fire punches a path twelve miles up into the stratosphere, creating a partial vacuum at the blast site that sucks thousands of tons of earth and ash skyward. A churning black pyroclastic column ascends fifty miles into the sky, pumping tons of particulate matter into the upper atmosphere, to an altitude where the mesospheric air currents can sweep it up and circulate it around the world.

Sunlight scattering off the high-altitude debris will paint the night skies with noctilucent clouds. In London on the night of June 30<sup>th</sup> the air-glow illuminates the northern quadrant of the heavens so brightly that the *Times* can be read at midnight. In Antwerp the glare of what looks like a huge bonfire rises twenty degrees above the northern horizon, and the sweep second hands of stopwatches are clearly visible at one a.m. In Stockholm, photographers find they can take pictures out of doors without need of cumbersome flash apparatus at any time of night from June 30<sup>th</sup> to July 3<sup>rd</sup>. These strange “white nights” will continue, gradually fading in intensity, throughout the month of July 1908. Scientists across Western Europe, unaware of events thirty-five hundred miles to the east, are at a loss to explain the phenomenon.

But here in Tunguska, where the cause is clear, the sky is far from bright. Darkness descends at mid-morning, as the heaviest clumps of dirt and ash precipitate out in a black rain.

The force of the blast continues to propagate outward, though it must traverse hundreds of miles of taiga before coming into contact with the first outposts of twentieth-century science. At the Irkutsk Magnetic and Meteorological Observatory, the free-swinging weights of hermetically-sealed Repsold balances chart the onset of a massive

earthquake five hundred and fifty miles to the north. Instrumentation as far west as the eastern seaboard of North America will soon follow suit.

But it doesn't take a seismograph to detect these seismic effects: close in, the isolated encampments of the Stony Tunguska clans are smashed flat, their birchbark *choums* sent flying as the subterranean pulses slam into them. Further out, houses sway and windowpanes craze throughout a circle two hundred fifty miles in radius, centered on ground zero. On the newly-completed Trans-Siberian railway line three hundred seventy five miles southwest of The Epicenter, a locomotive screeches to a halt lest it be thrown from the tracks by the tremors; the terrified engineer tells the conductor to get out and check for signs of a boiler explosion.

Magnetometers at Irkutsk Observatory, five hundred fifty miles due south of ground zero, record the raging of an unprecedented geomagnetic "storm," beginning at 7:23 A.M. local time and lasting nearly five hours. Echoes of the storm are picked up at the observatory at Pavlovsk, on the outskirts of St. Petersburg two thousand five hundred miles away. Even as far west as London, the *Times* will report "a slight, but plainly marked, disturbance of the magnets on Tuesday night." The next time the world will witness disruptions of the Earth's magnetic field on such a scale will be in 1958, following the detonation of an H-bomb at Bikini Atoll.

Moving at the speed of sound, a massive airborne shockwave thrums the coda to the event. Thirty minutes after and two hundred miles downrange of the impact, the barometers at a backwoods meteorological station in Kirensk record its passage. It will reach Irkutsk Observatory a quarter of an hour later. Attenuating with every mile, the concussion still retains enough energy to be heard as distant thunder a thousand miles away.

And even after dropping below the threshold of audibility, the pressure wave travels on. When it finally dies out twenty-five hours later, it will have circled *twice* around the globe, and left traces of its passage on barographs in Potsdam, London, Washington D.C., and Djakarta.

Miraculously, the event has expended its fury on one of the most desolate regions on the face of the globe. Had the impact occurred five

hours later, the Earth's rotation would have shifted the impact zone to the outskirts of populous St. Petersburg, and the death toll would have risen into the hundreds of thousands.

But, here in Tunguska, the only human casualties are from secondary effects: heart attacks and strokes suffered by a few of the Evenki tribesmen closest in. No one has died as a direct result of the catastrophe's hellish violence.

Jenkoul uncrouches from behind the steaming carcass that had been his mount. The young Evenki braces himself and—slowly, so as not to inflict further torment on his parboiled flesh—rises to his feet. In so doing, he attains what is now the highest vantage on the ruined Silgami ridge. The old-growth forest that had soared above his head has been leveled to the ground. He can see the whole of the sky.

And, in that sky, a towering black column shot all through with lightning—the lodge-pole of Ogdy—rises up and up forever.

In years to come, a multitude of explanations would be advanced for what became known as the “Tunguska Event.”

Most scientists initially assumed a giant meteorite had crashed that summer morning in the forests northwest of Vanavara Station. That hypothesis stood unchallenged for the nearly two decades that separated the event itself from the first on-site investigation of it—two decades during which scientific inquiry languished in Russia, preempted by war, revolution, and socio-economic upheaval. The few expeditions that did set forth in the intervening years were forced to turn back when their Evenki guides refused to enter the blast zone, fearing to trespass on the abode of the storm-god Ogdy.

Finally, in 1927, a team of researchers headed by mineralogist Leonid Kulik reached the site of the impact, where surrounding hills cupped the sloughs of the Great Swamp to form a landscape Kulik dubbed “The Cauldron.” The Epicenter itself was easy enough to identify: for hundreds of square miles all around the Cauldron, across an area half the size of the state of Rhode Island, the ancient forests of the taiga had been scorched and flattened by the blast. Hundreds of thousands of trees had been toppled like matchsticks in all directions,

forming a radial “throw-down” pattern in the shape of a gigantic target, with the impact site at the bulls-eye.

But, in reaching ground zero at last, Kulik had dealt a death blow to the meteorite hypothesis he himself espoused. For there was no crater.

With a yield of forty megatons—thousands of times more powerful than the atomic bomb dropped decades later on Hiroshima—the explosion should have gouged a hole in the Earth’s crust to dwarf the mile-wide, 500-foot-deep Great Barringer Crater in Arizona. Instead, what Kulik found at the very center of the blast pattern was a peat marsh contorted into a nightmare landscape. “The solid ground,” he wrote, “heaved outward from the spot in giant waves, like waves in water,” as if stressed by some unimaginable force.

With on-site observations all but ruling out the meteorite-impact hypothesis, the Tunguska Event became fair game for ever more bizarre conjectures: the collision of the Earth with fragments of a comet? a solar plasmoid ejected by the sun? the crash of a nuclear-powered alien spacecraft? a chunk of infalling antimatter?

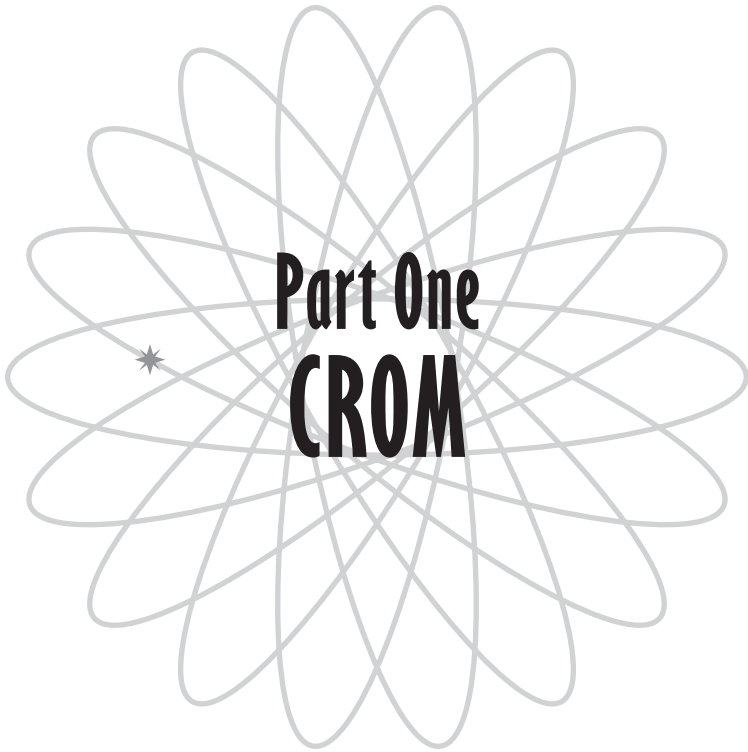
Not to mention, of course, the Evenki nomads’ steadfast conviction that Ogdy had vented his wrath on the clans of the Stony Tunguska.

But perhaps most outlandish of all was the explanation concocted some six and a half decades after the event, by two young astrophysicists at the University of Texas in Austin. Writing in the September 14, 1973 issue of *Nature*, Albert A. Jackson IV and Michael P. Ryan Jr. had the audacity to theorize that what had struck the Earth in June 1908 was a remnant of the Big Bang. That the bizarre circumstances of the impact all pointed to a cause that could only have been engendered in the unimaginable heat and pressure attending the birth of the universe itself.

That the Tunguska Event was nothing less than a collision between the Earth and a submicroscopic black hole.

—BILL DESMEDT

JULY 2004



*My own suspicion is that the universe is not only stranger  
than we suppose, but stranger than we can suppose.*

— J.B.S. HALDANE





# 1 | Proliferation Threat

**M**ARIANNA BONAVENTURE EASED through the access door and out onto the roof of 17 State Street. She paused a moment for breath and visuals. To one side, the mirrored façade of a setback penthouse held only her own reflection—a slender figure in black body armor with helmet to match. Straight ahead, nothing but an arc of deserted skyterrace and, beyond it, the forty-one story dropoff down to Battery Park. No one, and nothing, in sight.

They'd gotten past her somehow.

Or not. Audio was picking up what sounded like the prole and the extractor, talking in low tones somewhere past the curve of the penthouse curtain wall.

Marianna smiled behind the helmet's silvered plexiglas visor: *Gotcha!* Then she frowned. This was going to be almost *too* easy. From the top of this gleaming column at the southernmost tip of Manhattan, there was simply no place left to go. Her quarry had already run out of island, and now they'd just run out of sky.

What kind of an extractor paints himself into a corner like that?

She'd find out soon enough. Marianna darted across twenty feet

of rooftop garden and into the cover of the penthouse. She hugged the glass wall, began inching along its length.

One of the voices had started yelling. Still couldn't make out words. They'd be in Russian anyway.

Marianna risked a look, then ducked behind an art-deco heat-exchanger hood, out of the wind and line of sight.

Because there, silhouetted against a wedge of Lower Manhattan skyline, stood her wayward prole—the proliferation threat she'd chased through downtown's dog-day streets.

Seen by the flat, filmy light of a late July afternoon, the prole looked deceptively nonthreatening. Looked like what she was: a frightened, middle-aged woman.

Looked hardly at all like a renegade WMD researcher out to sell her expertise in weapons of mass destruction to the highest terrorist bidder. Which was also what she was.

The extractor, the big guy hired to snatch the prole out from under CROM's bodywatch, stood beside her. He was the one doing all the shouting, most of it directed at an unwieldy contraption of fabric and aluminum tubing propped against the guardrail.

That explained some of it.

"Compliance?" Marianna whispered into her helmet mike. "Got the prole up here."

There was a barely perceptible pause, then the man from the New York Compliance office came back. "On the damn roof?"

"The extractor's got a hang glider, looks like."

"You're shitting me. How'd he get it up there?"

"Don't know. Maybe—" Marianna glanced around, spotted a double door further down the penthouse wall. "There's a rooftop elevator. He could have broken the thing down, bagged it, brought it up that way. It's just..."

"Just what?"

"Just I don't get where he thinks he's going with it. The park's staked out, and there's nothing but river beyond that." Even with a twenty-to-one glide ratio and the weak westerlies of a summer afternoon, that rig would never make Jersey. Unless—

Now she could hear it: the sputter of a ten-horsepower motor firing up. “It’s not a glider, it’s an ultralight! They’re good to go.”

“Let them. They can’t hide from the spystars.”

“Guess again.” Marianna was looking at more bad news on her wristtop display. “Alpha set ninety seconds ago.”

“Damn! How long till Beta’s overhead?”

“Seven minutes.” Too long. Whoever’d planned this extraction knew exactly where the holes were in CROM’s piggybacked satellite surveillance.

“Okay, sit tight—I’m on my way.”

But Compliance was down at street level. By the time he could get here, her quarry would be long gone. And, with them, her last hope of making the Grishin case stick.

It was going to be up to her.

Compliance was still talking. “Don’t go trying anything stupid now, Bonaventure. Not when all you’re packing is that damned toy. I’ll be—”

She cut the connection then. But he was right: she’d been going by the book, and for urban engagements the book mandated non-lethal armament only.

Hence, her Squirt gun—a second-generation handheld version of the antipersonnel web-cannons in use since the mid-’90s. When it worked, which wasn’t always, it shot out fifty square feet of ruggedized microfilament coated with fast-drying binary adhesive. Ensnared in the stickyweb, a perp would be down for the count and gift-wrapped to boot. It had all sounded good on paper.

Out here in the field, she’d have given a month’s per diem for a twin to Compliance’s unauthorized Glock. Book or no book.

Oh hell, here goes. She stepped away from the wall and brought the flared muzzle of her “toy” to bear. “Hold it right there!”

The perpetrators froze. She edged toward them through rippling ninety-degree heat. Sweat trickled down along her ribcage under the stifling Vectran body armor. Her forehead was bathed in perspiration. A droplet felt poised to run into her eye, but she’d have to lift the visor to wipe at it.

Just a little further.

The prole raised her hands. Behind her, Marianna could see the extractor fiddling with some sort of handheld. He looked up. Marianna glimpsed a raw-boned, dark-complected face. Through wraparound goggles, cold black eyes stared back at her.

Unnerving, that lifeless gaze, like looking into the eyes of a predator. Marianna felt the gun tremble in her hands. As if scenting her fear, the man grinned at her—a feral grin, widening to reveal two steel-crowned upper canines.

It was like looking death in the face.

Marianna shrank back. Her stomach knotted. Adrenaline coursed through her veins, priming her whole body for flight.

No! She was *not* going to panic. She planted her feet, steadied the non-leth, and squeezed the trigger.

The Squirt gun emitted a hollow click.

No canister chambered.

The damn thing had malfed *again*. She slammed a small fist against the side of the barrel, pulled the trigger a second time. Nothing.

Still grinning, the man punched a button on his handheld. The elevator doors at her back slid open. Marianna whirled at the sudden hiss, but there was nothing there—not even an elevator. The penthouse express that her fugitives had commandeered was gone. She could hear it hurtling down to street level, leaving behind forty stories of empty air.

She turned back just in time to see the extractor raise a gun and fire.

A sledge hammer slammed into the pit of her stomach. Another, driving all the breath from her body. But—no worse, thank God! Her Vectran body armor, the same stuff they made the Mars rovers' hard-landing airbags out of, was living up to its advertising, absorbing the brunt of the bullets' impact. Too bad it couldn't dissipate their momentum as well. A series of body-blows pummeled her, propelling her backward, back toward the waiting maw of the empty elevator shaft.

For an instant that stretched to an eternity she teetered on the edge, fighting to regain her balance. Fighting and losing. Gravity seized her in its unrelenting grip.

Fetid air swirled around her as she fell, the square of light from the open door above her receding fast, faster.

Oh, God! Only one chance! Marianna gripped the Squirt gun in both hands and fired it at a passing stanchion. Please, *please*—work this time!

The gun kicked in her hands. Compressed gas exploded from the canister and propelled a spray of microfilament out through the expansion chamber at forty-five meters per second.

The stickyweb snagged the stanchion, the binaries fused, and—it held.

And—she held. Her hands tightened on the weapon's grip as deceleration shock tried to wrench her arms from their sockets. She slammed into the near wall hard enough to rattle her teeth. Still she held on, still alive. For the moment.

Numbers stenciled on the opposite wall told her she'd halted her descent at the thirty-seventh floor. The Squirt gun and holster ensemble were interlocked with her body armor, helping bear some of her weight. Still, both hands clutched the butt of the weapon in a death grip. Scarcely daring to breathe, Marianna dangled above the abyss, a pendulum on borrowed time.

Her helmet headset had been knocked askew, but not so far that its mike couldn't pick up her voice.

"Compliance... need help! Come... get me!"

She told him where, between gulps of machine-oil flavored air. "But... call Building Services first. Tell them... lock down... the penthouse elevator." She couldn't see the elevator car where it had come to rest more than five hundred feet below her. The extractor might have deactivated it to prevent reinforcements arriving, but no sense taking chances.

A hiss from above her. Four stories up, the elevator doors were closing again. Through them she could hear the engine's drone rise to an angry buzz. The ultralight was taking off for the wilds of New Jersey. Taking her prole with it.

Guess they hadn't run out of sky after all.

One more thing, then. "Compliance? See if you can raise HQ. ... Tell Pete, tell him got to... go with the Archon option."



Like the two before it, the third email incident of the day found Archon consultant Jonathan Knox in a very strange place—his own office.

Strange, because Knox's clients usually demanded his full-time physical presence on *their* premises, consistent with their belief that they owned his ass. A not altogether unreasonable assumption, given the breathtakingly exorbitant rates Archon Consulting Group charged for the services of its most senior analyst. But it did mean that in an average year Knox saw the inside of his office about as often as the guys who came in to shampoo the wall-to-walls. And, like the carpet cleaners, he saw it mostly at night.

No one, least of all Knox himself, would have expected him to be sitting there midway through a midsummer Tuesday afternoon.

If he hadn't been, there's no way he could have found out that somebody was stealing his identity.

As it was, though—

"You've got mail," the desktop announced.

Knox's gray eyes, strangely old-looking for what was otherwise an almost boyish face, flicked from the five-hundred-page document in his lap to the little email icon now blinking in the upper righthand corner of the twenty-four-inch display.

Definitely weird. No one ever sent him email here at Archon, there wasn't any point to it. Knox had been on assignment at Broadband Utilities Unlimited longer than most of BUU's employees. Anyone who needed to reach him emailed him there.

Probably just a system glitch, like the first two.

Knox stretched his lanky six-foot-plus frame, tipped the contoured chrome-and-leather armchair back even more precariously, and returned his attention to the Functional Requirements spec.

That five-pound cinderblock of a document was his sole reason for being here. It would take total, Zen-like concentration to review it by the Friday drop-dead date, and BUU's North Jersey headquarters was hardly conducive to that. The place was even more of a madhouse than usual this week, caught up in a paradigm shift of tectonic proportions as the latest management methodology-du-jour kicked in.

No, better the relative peace and quiet of his commodious corner

suite at Archon's New York headquarters, with its expanse of burgundy broadloom and its floor-to-ceiling view of the East River twenty stories below.

And its periodic announcements of email that wasn't there.

If Knox had been engaged in anything more absorbing, he'd have ignored the interruptions. But whoever said "reads like a novel" wasn't talking about this Functional Requirements specification. He looked up, cleared his throat, and said "Mack, open my mailbox, please."

A brief pause while Mack, Knox's desktop computer, processed this utterance. Then: "Your mailbox is empty."

Huh! And yet the incoming-mail icon was still blinking merrily away in the corner of the screen. For the third time since he'd arrived this morning, his system couldn't seem to decide if he had email or not. Knox ran his fingers through his already unruly brown hair, thought a moment, then said, "Mack, see if Bob is in."

In response, a videoconference window popped open on Knox's screen, complete with the dreadlocked talking head of Bob Stevens, Archon's system administrator.

"Hey, Jon," Stevens's grin was dazzling white in his dark face. "You coming to the bash?"

"Huh? No, I was just calling in a couple rogue emails. Why, what's up?"

"Boss man's taking the gang down to Radio Mexico for quesadillas and Dos Equis."

"That's our Richard." In the fifteen years Knox had known him, Archon CEO Richard Moses had never passed up an excuse to throw a party.

But, still and all, Tuesday afternoon? "Any particular reason?"

"We just won us a slice of the Psyche project. Word came in an hour ago, now it's raining beer and nachos. You coming?"

"Sounds fun. But duty calls. Got to get through this thing—" Knox thumped the Functional Requirements for emphasis, "—before I leave for London next month. Now, about my email..."

"First thing in the morning, okay?" Stevens was already glancing off screen, toward his office door.

Knox grinned. "Sure. Enjoy."

The window closed, leaving Knox alone with the BUU document.

He re-read the page he'd stopped on without any noticeable increase in comprehension. Something was nagging at him. He'd learned to trust that feeling.

What was the old saying? "Twice is coincidence, third time is..." Knox snapped his fingers. "Third time is enemy action!"

Despite, or perhaps because of, having perpetrated more than a few email spoofs in his time, Jonathan Knox found he did not enjoy being made the butt of one himself. But that's what it looked to be: someone—one of the backroom code jocks, most likely—had hijacked his account and was carrying on an electronic correspondence pretending to be Knox.

Those bozos! All's fair in love, war, and the pissing contest that had raged unchecked between Archon's programming and consulting staffs since day one, but this crossed the line. Knox grinned unkindly as he contemplated various retaliatory options. Perhaps a Trojan horse?

Just then, his speakerphone beeped.

"Jon," said the voice on the other end, "bag what you're doing and come on down, boy!" The slightly slurred baritone belonged to Richard Moses. Calling, no doubt from the Radio Mexico fête. Yes, in the background Knox could hear voices raised in off-key song, counting down "A Hundred Bottles of Beer on the Wall" in hexadecimal notation. Programmers!

Which reminded him. "I can't right now, Richard. I'm hung up on something here."

He said goodbye and hit the *off* button. Best not to be too specific. For all Knox knew, Richard himself could be behind this—he was no less an arrested adolescent than the rest of the Archonites.

Knox could see them now, swilling brew, carousing, having a good laugh at his expense, while he—

Wait a minute. The Archon offices must be all but deserted, emptied at quarter of five on a Tuesday afternoon by Richard's impromptu celebration. So, *who was running the scam?*

The few stragglers in sales and accounting didn't count: none of them had the skill-set for a world-class goof like this. Even if the thing



itself could run unsupervised, the fact remained that the culprit hadn't hung around to see Knox's reaction to the prank.

And that was just plain unthinkable. Knox had never aspired to membership in the coder fraternity himself, but he was an astute observer of its folkways. And not showing up to gloat once a trap had been sprung was, he knew, an unpardonable breach of alpha-nerd etiquette.

Can't have been anybody here, then. What did that leave? It *must* be just a mail-server glitch.

But that old feeling—that sense of a larger pattern lurching around in the darkness behind the veil of immediate sense experience—wasn't going away. On a hunch, Knox reconfigured his desktop to pull mail the instant it received notification. Then he waited.

Not for long. On the next “you've got mail” announcement, he found himself staring at a system error: MAILBOX IS LOCKED BY ANOTHER POP3 PROCESS.

He tried retrieving the message manually. Now the mailbox was unlocked again. And empty again.

Enemy action! Somebody had installed a daemon in the server, an autonomous process that was intercepting his email. If it was a prank, it was a damned elaborate one. But it was looking more and more like identity theft pure and simple—the misappropriation of Knox's cyber-space persona for purposes of illicit correspondence.

That correspondence, at least, was easy enough to trace.

“Mack, show me the IPM log for *jknox@thearchongroup.com*.”

Archon's central server came equipped with state-of-the-art Internet Policy Management software. Among other things, the IPM tracked all the emails moving into and out of the organization and could list them on demand. Not the message-bodies themselves, just subject-lines, senders, and addressees.

But that was enough. Considering Knox almost never used this account himself, the log should have come up empty. Instead it held eight or nine entries, the oldest of them—entitled “Long time no see”—dating from this Sunday. That message, and about half the others, had been forwarded through the *jknox* account to someone called *kosmo@gei.ru*, and had originated from...

Knox frowned as he read the sender's address: *reck2@crom.doe.gov*.

*Doe-dot-gov*? That was the federal government — the, um, Department of Energy. A quick websearch brought up the DOE home page, but there was no “CROM” listed among its agencies. An undercover op, maybe, and of some hitherto uncatalogued subspecies.

What had he gotten himself into here? Knox had pissed off a lot of people in his time, but that was just *una cosa di biznes*. And, anyway, he couldn't recall any feds among them.

Why were the spooks messing with his email?

Damned if he knew, but he did know the quickest way to find out.

“Mack,” Knox addressed his computer again, “link in Weathertop, secure circuit. I need to talk to Mycroft.”

Spooks or no spooks, *somebody's* gonads were going to wind up stapled to his office wall tonight!



What was keeping the Compliance guy?

Marianna hung in near-total darkness, trying not to gag on the oily reek filling the elevator shaft. Trying not to think about how long the stickyweb would hold. The adhesive wasn't designed to support a one-hundred-thirty-two pound load, was it? Not swinging back and forth?

Think about something else. Like what? Like how bad she'd wanted this first field assignment? And how bad she'd gone and screwed it up?

But it was *her* case, dammit. Her analysis that had tied the last two disappearances back to the shadowy Grishin Enterprises conglomerate, her late nights and weekends that had put CROM out ahead of the curve on this one.

She should have left it at that. She couldn't. Call it a chance to settle an old score, call it a misplaced search for some sort of redemption, but she'd had to get out from behind her desk and into the field. She'd cashed in favors and half-forgotten promises, lobbied Pete mercilessly, all so she could be in on the bust. And now —

Where in *hell* was Compliance?

Look on the bright side. At least the email spoof was still running — going on two days now without a hitch. One thing that hadn't gone

wrong yet. And with any luck the mark wouldn't catch wise till too late. By Thursday night, she should—

Wait one. What was that?

If she strained, she could almost hear—yes, a rumble coming from below, faint at first, but growing with every second.

Oh, *shit!*

The power must've come back on before Compliance could find the cutoff. The penthouse elevator was beginning its ascent, building speed. It would be here in less than half a minute, moving fast as an express train—and she had no way to get out of its path!

## 2 | Resource Recovery

“COMPLIANCE?”

Marianna hung in the lightless shaft straining her ears for an answer. None came. The onrushing elevator car was very close now. She could make out the low-watt service lights set into the frame of its roof. Only seconds left.

She couldn't die like this. *Do* something!

“Compliance?” What was the guy's name again? “Whitehead? Talk to me. I—I've got a situation here.”

“Keep your pantyhose on, Bonaventure,” a voice crackled over her headset, “We're coming to get you.”

Daring another glance down, Marianna could see the elevator slowing, slowing, easing to a stop inches below her feet. A muffled clang and a hatch opened in its roof.

Light poured up out of the hatch, catching Compliance's angular features from below and twisting them into something vaguely Me-phistophelean. He reached up for her.

“Thought it'd be quicker this way,” he said, helping her down into the car. “No telling how long till the stickyweb broke. Then—*splat!*”

He wasn't bothering to hide his smirk. She wouldn't put it past him to have arranged that business with the elevator just now deliberately. A field agent's way of showing the desk jockey with the fancy job title her real place in the order of things.

Assistant Director, CROM Reacquisition. What a crock!

She was silent the whole ride down to ground level, afraid that if she spoke her voice might tremble. She couldn't bring herself to look at the man from Compliance, just kept her eyes straight ahead. From the burnished surfaces of the elevator doors a woman in black body armor peered back at her—tall, slim, dark-haired, young.

Above all, young. Too young, maybe, to hack it, out here in the field.

The doors slid open. She followed Compliance out into a double-height lobby newly festooned with Day-Glo *Police Line—Do Not Cross* tape. They walked through the exit doors and out into the late afternoon heat.

Marianna jerked a thumb back at the growing police presence. "Have you talked to NYPD?"

"We can't bring the cops in on an extraction. You know that."

"Dammit, I'm not talking about need-to-know! The cops run a river patrol, don't they? If not them, the Coast Guard. *Somebody's* got to've seen which way they went."

Compliance paused beside the car. "Face it, Bonaventure—that prole is long gone."

She got in and waited till he'd joined her. "You're calling it a hand-off, then?"

"Yeah, might as well make it official. But—" His hand hovered over the STU-IV keypad. "You sure we don't want to get our story straight first?"

She shook her head. "We'll play spin control some other time. Just log the handoff so I can get started fixing this." If it was even fixable. If the black hats hadn't already won, like they had eleven years ago.

With a shrug, Compliance punched in the code and nodded to her to jack in. Handshake tones fluted in Marianna's headset as the Secure Terminal Unit negotiated a one-time encryption, then: "Critical Resources Oversight Mandate. How may I direct your call?"

“Uh, this is Whitehead, New York Compliance office. I need to make a field deposition.”

A momentary pause, then: “Recording.”

“Right. As of—” He glanced at the dashboard clock. “— 5:23 P.M. Eastern Daylight Time, July 27<sup>th</sup>, Compliance Directorate is transferring anti-proliferation action 04-057, Galina Postrel’nikova, to Reacquisition. Hardcopy follows.”

If it hadn’t been her case before, it sure as shit was now.

“Line’s still up,” Compliance was saying. “Want to talk to your boss?”

“In a minute.” Marianna tabbed down the passenger-side window and stuck her head out. Her dark brown eyes made a futile scan of the empty sky.

Where in hell could her prole be *going*?



Natalya Petrovna Zolotova clutched frantically at the harness straps as the ultralight looped high out over waterfront towers and atriums toward the broad sweep of the river hundreds of meters below. She shrieked as the flimsy craft lurched sickeningly in the updraft from a rooftop airconditioning unit, stifled another scream when it dipped unexpectedly on entering the regime of cooler air over the water.

The rushing airstream bore her small cries away, rendered her terror inaudible even to herself.

Certainly the pilot gave no sign of having heard her. Natalya risked a glance over to where he hung suspended alongside her, so close she could have reached out and touched him. Not that she would have dared. If possible, she feared this grim-visaged man, this Yuri Vissarionovich Geladze, more than she feared falling into the river below.

And with good reason. He had killed that woman back there on the roof. Shot her as casually as one might shoot a stray dog.

Surely it had been a woman. The visor had concealed her face, but the body, stance, and voice were unmistakably female. The woman’s shouted English had gone by too quickly to register, but her brandished weapon had made the meaning only too clear: Natalya was being arrested. But for what?

All she had done—all!—was to leave *Rusalka* that morning and, on her way through customs, show the counterfeit passport she had been given. The passport with the photograph of Natalya's own face above that other woman's name: Galina something.

Yes, it had been wrong. But it had been her only chance to disembark and explore the great city rising into the sky beyond the 39<sup>th</sup> Street pier.

And besides, what choice had she had? A lowly clerk-typist dared not disobey the orders of Vadim Vasiliyevich Merkulov, head of security for all of Grishin Enterprises International, and the third most powerful man on *Rusalka*.

*Rusalka*. Natalya squinted against the wind and turned her gaze upriver, up to where *Rusalka's* shimmering white form towered over the ferries and dayliners, a visiting queen holding court amid the plebian denizens of the waterfront.

Any moment now, the glider would swing north toward the great ocean-going yacht. And once Natalya was back onboard, things would be all right again. It could all be fixed. Forged passports, a broken corpse at the bottom of an elevator shaft—no matter: GEI, the all-powerful Grishin Enterprises International, could fix anything.

Pray God, let it be so! Natalya willed her right hand to release its deathgrip on the strap. Just long enough to make sure that Mama's locket was still securely nestled beneath her blouse. She clasped it to her heart for a moment, feeling its surprising weight again. Yes, thank God, it was still there—still safe.

A foolish indulgence. The simple silvery locket hanging in the window of the Eighth Avenue pawnshop had been priced at an unthinkable hundred and twenty-five dollars. And, bargain as she might in her halting English, the aged proprietor had refused to part with it for less than ninety.

"Pure silver," he had claimed. But it didn't have the feel of the silver tableware aboard *Rusalka*—too heavy. Could it be silver-plated lead? Fearful of being swindled in this strange city, Natalya had hesitated. But when the locket had opened to reveal, of all things, a little Orthodox cross engraved on the inside of the lid, she knew she was lost.

It would make a perfect gift for Mama—a gift to commemorate her youngest daughter's day in New York.

A day that was ending. Natalya would be home soon. She braved a look down to see if they'd begun their descent. She saw huge tankers and container vessels plying the river below, each attended by a retinue of tugs. Saw the wakes of small, swift powerboats tracing their obscure calligraphies across the placid surface. Watched the pastel green of the Statue of Liberty, luminous in clear afternoon light, pass below immediately on her right.

Surely that was wrong. They must have missed their northward turn, continued out over the river and angled south. The expensive apartment buildings crowding the far shore, almost directly ahead of them when the flight began, had slid off northwards. In their place, the shoreline ahead now held what seemed to be an old, unreconstructed industrial quarter.

They were already much lower. The little motor was laboring to clear the roofs of the abandoned wharves lining this stretch of riverbank. They could not be going very much farther, but where—?

They spiraled downward into a wasteland of rusted storage tanks, junk-strewn empty lots, the burnt-out hulks of factories and warehouses—a no man's land transected by truck-filled highways. Here and there, last-gasp urban renewal strove to stem the tide of post-industrial blight, manifesting in compact corridors of incongruously bright and cheery buildings cordoned off from the pervasive decay.

The ultralight was vectoring toward one of those islands of order amid the chaos.

Very close, almost directly below them now, she could see a wide, flat roof with a name painted on it in large white letters. In the Latin alphabet, of course, as everything here was, but Natalya could read it well enough: RESOURCE RECOVERY SYSTEMS, Inc.

And beneath that, somewhat smaller: BAYONNE NJ ENTERPRISE ZONE.

And beneath that? A logo of some sort. She couldn't make it out from this angle, but its shape and color looked right. Her heart lifted in hope.



The ultralight overshot the roof and looped back toward it, lower and slower now, heading into the wind.

She started at a sudden sound. Her companion—silent ever since they had taken off from the tower—was shouting something at her.

“Lower your legs and push back on the control bar,” he bellowed over the howl of the wind. “No, like me. Watch, do as I do.”

Natalya tried to copy his movements, letting her legs hang down as she straightened her arms against the control bar. The craft’s nose rose into the air. Their airspeed dropped to a stall as they skimmed the roof-top, its tarred blackness very close now, mere centimeters from the soles of their shoes. Closer, closer. Contact!

She nearly stumbled as her feet skidded on the bumpy surface, but the pilot compensated, taking the brunt of the landing with knees flexed and feet spread wide. He stood there a moment, then held the wingframe aloft with one arm as he shrugged out of his harness, motioning her to do the same.

Natalya looked around for the logo she’d glimpsed from the air a moment ago.

The mottled, uneven texture of the tarred roof made for a poor canvas. Even so, the bold, stylized lines were instantly recognizable: the great blue globe crosshatched with white striations of latitude and longitude, the continents of Europe and Africa outlined in a verdant green. And embracing the whole, completely obscuring the equator, an image out of myth—the emerald coils of a world-encircling serpent, its fangs sinking into its own tail. The crimson letters GEI arced over the north pole like an aurora.

At that moment, the corporate icon looked so radiantly beautiful she could have knelt down and kissed it. She slipped a hand beneath her blouse to pat the little locket once more in thanks.

Natalya had made it back safe after all.



“You rang, Jonathan?”

Knox looked over at his display and saw Finley “Mycroft” Laurence peering at him from a conferencing window. Half an hour. Most callers wouldn’t have rated so quick a callback. Wouldn’t have rated real-

time at all, just a GIF of an old TV test-pattern and instructions where to send an email. Mycroft didn't waste bandwidth on nonessentials, a category that, for him, included most social interactions. Knox was one of the few he deigned to favor with his full telepresence.

And what a telepresence! Weathertop's image enhancer had gone all-out today, painting Mycroft in straw hat, candy-striped jacket, and white ducks, and then bluescreening him into a scene of punting on the Thames.

But the dark, solemn face made an odd contrast with the whimsical Jerome K. Jerome virtuality: in the eighteen months since Knox had last seen him (it doesn't pay to abuse some privileges), Mycroft had aged. The lines of the lean, regular features seemed incised a little deeper, the grizzled hair peeking out from under the boater had gone grayer, playing catch-up with his scraggly salt-and-pepper beard, and the piercing brown eyes behind the granny glasses were rimmed with circles darker than the mahogany of his cheeks.

They were working him too hard.

It was hard not to. Mycroft was too damned useful. Not to mention lucrative: if Knox's billing rate was exorbitant, Mycroft's was astronomical. You could buy a Bentley for what two weeks' worth of Finley Laurence's time would cost you. A well-accessorized Bentley.

Mycroft's official title—vestige of a time when Richard Moses had foolhardily let his top people make up their own job descriptions—was Senior Vice President for Intractables. Unofficially, he was Archon's one-man Research Department. Best in the business, if you could get his attention. Knox knew the magic words.

"Hi, Mycroft. I've got a puzzle for you."

Mycroft couldn't conceal the gleam in his eye, but all he said was "Timeframe?"

"ASAP. Yesterday, if possible."

"Time travel?" Mycroft shipped his computer-generated oars and cocked an eyebrow, "I believe you want Mr. Wells—Mr. *H. G.* Wells. Given my current workload, I'm not sure I could help you with future deliverables, much less past ones."

"This is just a quick hack-and-slash. You'll be done in less time than it would take you to convince me you haven't got time to do it."

Mycroft sighed. “Perhaps a quick look. Search parameters?”

“I haven’t got much, just an email address. But I have faith in you.” Not only was Mycroft a world-class net warrior, he came equipped with an eidetic—what used to be called a photographic—memory to boot. If an elusive factoid couldn’t be found on the web, it was probably catalogued and cross-referenced in the capacious vaults of Mycroft’s cerebral cortex. His quirky brilliance, coupled with his self-imposed exile to a hilltop in rural North Carolina, had earned him his office nickname: the original Mycroft was Sherlock Holmes’s smarter, reclusive brother.

“And the address is?”

“Oh, sorry: `react2@crom.doe.gov`.”

“DOE—as in Department of Energy?”

“The very same,” Knox said. “CROM looks to be one of their sub-agencies, but there’s no hotlink for them on the DOE homepage, and all my searches come up empty.”

“And your interest in this *crom* is, if I might ask?”

“They hijacked my email. I want to know why. I want them researched with extreme prejudice.”

“You can’t imagine any reason the Energy Department might be after you?”

“Not offhand. I’m all paid up on my utility bills. Oh, and—Mycroft? There’s one other search criterion.”

“All grist for the mill, Jonathan.”

“Right. I’m particularly interested in any connection between this CROM crowd and an outfit goes by the name of Grishin Enterprises International. Them, I could find. They’ve got a corporate website at `www.gei.ru`.”

The “dubbya-dubbya-dubbya” keyphrase inadvertently triggered the desktop’s speech recognizer. A browser-window popped up to display the GEI homepage. Knox left it open. He’d already paid the site a cursory visit, but a re-look couldn’t hurt.

“*Ru* for Russia?” Mycroft was saying, “Mightn’t this have to do with your former life?”

Knox didn’t answer immediately. He was looking at the home page

logo now filling the browser window: the stylized image of an Ouro-bouros, crushing the world in its great green coils.



Boris Petrovich Volin watched instant replay of the ultralight landing on the rooftop of his plant. Nicely done, that. He spoke the words that switched his large-screen monitor back to real-time display. Now it showed a uniformed guard escorting pilot and passenger down the access stairs toward the headquarters suite. Volin leaned forward, taking the opportunity to study his guests.

The woman was nondescript, hardly worth a second glance. A dumpy dishwater blonde waging her lonely battle with middle age, and losing.

Her companion was another story altogether.

Perhaps it was just the contrast with the pallid skin and hair of the woman, perhaps some trick of the stairwell lighting or the closed-circuit video, but the man seemed...dark. A darkness somehow more than physical, though it started with physical attributes, with the black leather flight jacket hugging the hulking frame, with the swarthy complexion of the grim, heavy-boned face, the straight, sable hair and black slashes of eyebrows and mustache, the empty black eyes.

Darkness personified. Volin repressed a shudder.

He swiveled in his chair and called up the instructions he had been emailed regarding this visit. What was the man's name again? Ah, yes, Geladze, Yuri Vissarionovich Geladze. A Georgian — that explained it. Explained both the dusky Transcaucasian cast of his features and the aura of a ferocity barely held in check.

Volin had keyed his monitor off and was striding out from behind his rosewood desk by the time the visitors were shown into his suite. His Armani suit rustled silkily as he extended a hand.

“Welcome to Resource Recovery Systems. Boris Petrovich Volin, General Manager, at your service. We have been expecting you.”

“Very pleased. Zolotova, Natalya Petrovna.” The woman all but curtsied. Her dark companion merely grunted.

The woman looked simultaneously shaken and relieved. Good. More manageable that way. Merkulov had chosen well: she seemed

only too willing to be led by the nose, like a lamb to slaughter. Only too willing to take everything around her at face value.

Including Volin himself. Not that he did not look the part of a chief executive for a major GEI subsidiary: tall and slim and polished, his angular features framed by wavy brown hair just going gray at the temples. Certainly neither he nor his operation bore any resemblance to the low-tech competition in the greater metropolitan area's thriving waste-disposal business. Still, if pressed, he might have acknowledged more than a little kinship with his rivals of Sicilian extraction, under the skin.

"Your driver just phoned in," Volin said. "He has encountered congestion at the Lincoln Tunnel." He smiled an apology. "Unfortunate, but only to be expected during peak traffic hours on a weekday. We now estimate your vehicle will not arrive for another forty-five minutes."

The dark man shrugged and nodded, the barest minimum required to keep up his side of the charade. The woman, predictably, acquiesced.

"Since you must wait in any case, please permit me to show you our facility." Volin grasped the woman's arm and motioned her companion to follow.

The flooring underfoot changed from noise-absorbent parquet to ringing steel grating as they walked out into the main bay of the plant and up onto a narrow catwalk. Ten meters below them, the floor was crisscrossed by a maze of color-coded piping, most of it leading into a mammoth stainless-steel cylinder standing on end in the middle of the hall. At evenly-spaced intervals along the catwalk, eight enclosed tubes angled down like opaque water-slides to intersect the top of the cylinder. Every surface in the room sparkled and shone in the overhead fluorescent lighting, lending the facility an air of obsessive cleanliness.

"Just a skeleton crew on duty this afternoon." Volin leaned on the catwalk's rail and indicated three workers in Day-Glo orange environmental bunnysuits tending widely-scattered control stations down on the plant floor. "All reliable men. In view of the sensitivity of your presence here, the rest of the day shift has been sent home early."

"Night shift?" the dark man said in Georgian-accented Russian. He could speak after all.

“Instructed not to arrive until eight p.m. I trust that is satisfactory?” Would a hired killer appreciate the economics of the situation? “We here at RRS are, of course, eager to support the goals of the parent organization in any way we can. But that does not relieve us of responsibility for our own contribution to the GEI bottom line. And canceling tonight’s shift altogether would have had an unacceptable impact on quarterly earnings.”

Volin trailed off. The man was staring at him now.

He swallowed. “It—it would have meant shutting down the catalytic reactor, you see.” He pointed at the huge cylinder. “And we would then have lost a good ten hours, and many kilowatts, cold-starting it back up to operating temperature.”

The dark man made no reply, simply continued to fix him with that baleful glare.

A palpable silence descended, stretched out uncomfortably.

“You must understand,” Volin began again, “how essential it is to keep a plant like ours running continuously. Our EPA-approved recycling process involves immersing hazardous waste in a “bath,” as it were, of molten iron. As has long been observed in steel mills, red-hot iron possesses solvent and catalytic properties able to break down organic waste products into their component elements. In a triumph of Russian metallurgy, our Resource Recovery business unit has harnessed this effect in the service of environmentally-friendly conversion of toxins into useful raw materials.

“This means, however, that it is far more energy efficient, far more *profitable*, to maintain the bath at constant temperature on a twenty-four-by-seven duty cycle. It becomes prohibitively expensive to allow the reactor to cool down overnight, only to reheat it next morning to the melting point of iron, or higher.”

“Higher?” Did the gravelly voice betray a hint of interest for once?

“Well, yes. Normal operating range is around fifteen hundred fifty degrees Celsius, but we can bring the bath all the way up to seventeen hundred for special decontaminations—chemical demilitarization of VX nerve gas, for instance.”

The woman paled.

“No, no, nothing like that going on right now,” Volin said, all reas-

surance. “Today’s run is quite routine: carcinogenic byproducts from local pesticide and chemical plants. Never a dearth of dioxins and PCBs here, you know. Here in New Jersey we are sitting on a gold mine of toxic waste.”

The dark man spoke again: “This waste goes in how?”

“You see these eight chutes?” Volin pointed to the tubes angling down to the giant cylinder. “They empty out over the molten metal pool at the core of the reactor vessel. We simply load them with hazardous material, solid or liquid, and let gravity do the rest.”

“Show me.”

“Of course. If you will just step this way.” Any moment now. Why was the man waiting? Surely he intended to do it before—

Volin led them to where the catwalk flared out into a rectangular balcony. To their right, thick red piping ran up vertically from the floor below, then elbowed toward a chamber occupying the center of the platform.

Volin strode over to the chamber’s solid steel door. “Behold: the Vestibule to Hell!”

He chuckled at his small joke, then sobered when no one joined him. “Nothing so dramatic, actually. Merely an airlock. The hazmat is loaded through this outer portal into the holding chamber.” Volin entered a code into a keypad set into the jamb, and the door swung open soundlessly to reveal a cubical interior two meters on a side. “Then, when the run is ready, the chamber is sealed, the floor retracts, and the material slides down the chute into the bath. Any questions?”

“No,” said the dark man.

And with that, he seized the woman by the nape of her neck and hurled her bodily into the chamber. He swung the heavy door closed on the beginnings of her scream.

He turned to Volin. “How long?”

“To, um, ah, cycle through, you mean?” Volin was having trouble getting the words out. “As, as soon as an airtight seal is reestablished. Twenty seconds, no more. Y-you can watch the countdown on the display over here.”

He led the dark man around to a control console built into the right

side of the chamber. Away from the incoherent sobs and frantic pounding now issuing from the other side of the door.

*Alive!* She was going into the bath *alive!* Volin's stomach heaved. He fought to keep his rising gorge down, fearful of losing control in the other's presence.

Calm, calm. Nothing too unusual here. After all, total, traceless obliteration of inconvenient bodies was RRS's most lucrative sideline, a premiere service offered to a select East Coast clientele.

But up until now the bodies had always been *dead* first!

Oh, Volin understood the logic of not simply putting a bullet through her brain: Someone at the top, perhaps Arkady Grigoriyevich himself, had required there be no evidence of this woman's passing, not even so much as a spent cartridge casing. But surely she could have been stabbed or strangled or—anything but this!

The futile pounding ceased; in its place, an equally futile pleading began. The woman had evidently understood enough of Volin's orientation lecture to guess what would happen once the airlock's cycle completed, and its second door—the entire floor of the loading chamber—swung open to dump her down the steeply-sloping shaft.

Then she had no need to guess. The countdown stood at zero.



Yuri watched status lights flashing red, indicating the load chamber's second, inner door was swinging open. Above the blaring of the klaxon he could hear a series of clangs as the floor retracted, then a dull thump as the woman dropped into the lance.

The engineers who designed the Resource Recovery plant had seen no need to soundproof the walls of the chute feeding into the molten metal bath. Until today all of the bulk solids slated for destruction had gone mute and unprotesting down its throat to the inferno. So it was perhaps understandable if the heat insulation lining the chute could not contain the echoing wail that accompanied Natalya Petrovna Zolotova's scrabbling slide toward the red glow of the bath below. A wail that rose freakishly in pitch as the cascaded ventilation system pumped hydrogen into the tube in place of oxygen.

Out on the plant floor, two of the orange-suited workers raised



their heads at the surreal scream. Yuri glared down at them. They quickly bent to their instruments again.

Yuri turned back to the RRS manager. The man's face was ashen. With all his fine talk of quarterly earnings and EPA approvals, the administrator here had forgotten what business he was in. No matter. The squeamishness of others was what ensured there would always be a market for Yuri Geladze's services.

He looked the man in the eye. "I must see."

"S-see?"

"See her die," Yuri said. Arkady Grigoriyevich Grishin, CEO of Grishin Enterprises and their mutual employer, had ordered Yuri to confirm personally that the Galina stand-in was gone without trace. Now *there* was a man who did not flinch from what must be done.

"We, we cannot really see into the reactor vessel, as such," the manager stammered. "It is much too hot inside for conventional optics."

Yuri frowned. The man added hastily, "There *is* a monitoring capability employing high-resolution ultrasound. It can image both above and below the surface. Will that be satisfactory?"

"Show me."

In response to the manager's keystrokes, the console's main display came to life. Grayscale images depicted the interior of the cylinder below them in ghostly relief.

"I-I think we should see—yes, there!" The manager pointed to where a writhing shape, rendered in halftones, plummeted from a dark aperture near the top of the screen into the molten metal occupying its lower half.

The liquefied iron was far denser than water, its surface tension much higher. That made for an unexpectedly small splash, followed by a slow but inexorable engulfment of the thrashing victim—the briefly thrashing victim. Like a worker caught in a steel-mill spill, she might last a second or two but the outcome was never in doubt.

The woman's mouth was locked open impossibly wide, as if for one last scream. Nothing came out—her lungs and diaphragm, together with the rest of her soft thoracic and abdominal organs, had already burst and dissolved in the metallic flux. Bodily fluids vaporized into gouts of superheated steam. Sudden gaseous ventings animated what

was left of the limbs in a grisly parody of life. Finally, the spinal column collapsed, scattering vertebrae like poker chips and plunging the skull itself into the incandescent broth.

Yuri watched the skeleton dissociate into individual bones. They bobbed a while on the red-hot surface before they too dissolved. He shrugged. He had seen worse. Had done worse.

“No burning?” he asked idly.

“No, no, of course not.” The manager removed his spectacles and wiped the sweat from his brow with the sleeve of his expensive-looking suit jacket, “The whole decomposition process takes place in a reducing atmosphere. Burning is impermissible: there can be no oxidation whatsoever, or we would lose our EPA certification as a nonincinerative waste-disposal technology.”

Yuri turned back to the display.

“The bones are the last to go,” the manager was saying quietly. “Those, and the teeth, of course. Almost pure apatite: the same material rocks are made of.” Color had returned to his cheeks. He no longer looked as though he were going to faint or vomit. *This* part he would have seen many times before.

“What is that?” Yuri pointed to a small blob on the screen. It was sinking slowly through the melt, jostled from side to side by convection currents.

The manager put his spectacles back on. “I—hmm, I don’t know. Most metal objects lose their integrity in the bath. But there are tapping nozzles installed in the base of the reactor unit for just such eventualities. If you will wait a moment, we shall see.”

The manager dispatched one of the orange-clad workers to retrieve the curious object from where it had settled at the bottom of the reactor tank. Yuri continued to watch the now-unchanging display.

“Yes, here it is.” The manager took a silvery lump from the worker’s gloved hand. Its true shape was hard to make out, so much iron had congealed around it in its trip through the molten bath.

“What is it?”

“It appears to be a, ah, pendant of some kind.” The manager handed it to Yuri. “The woman must have been wearing it beneath her clothes.”

Yuri lifted it to the light. It was still warm to the touch. “Silver?” he asked.

“What? No, no, silver would have dissolved. No, my friend, from its weight, its color, and especially its high melting point, I would say this is made of purest platinum.

“Keep it, if you like.” The manager smiled wanly. A souvenir of your visit to Resource Recovery Systems. It is worth more than gold.”

## 3 | Schwarzschild Radius

**W**HERE IN *HELL* could her prole have been going?

For maybe the fifth time that night, Marianna Bonaventure sat up in bed and turned on the nightstand lamp. Not that her cramped government-rate hotel room was much to look at, but the light helped push back the thoughts that kept crowding in on her in the dark. Thoughts that began prosaically enough, on a sidewalk in lower Manhattan — not so many hours ago, not so many city blocks away from where she now lay, sleepless at three in the morning — thoughts that then mutated into a nightmare montage of breathless cross-town pursuits, rooftop confrontations, elevator shafts —

*Shit!* Even the light wasn't helping. She switched it off and flopped back against the pillow again. Think about something else, Marianna, think *good* thoughts. Good thoughts like...

Ghostly scrawls inscribed the darkness: S-curves and tridents, angle-brackets and lissome, leaf-like glyphs. Puzzle-pieces from a primeval alphabet known as Linear A, whose still-undeciphered secrets, and those of the Bronze Age Minoan civilization that devised it, had held a lifelong fascination for her father, Jeremy.

Her eyelids fluttered closed. Behind them formed another vision—a cratered crescent rising out of the sea. Marianna's lips shaped a word, though no sound came out: *Thira*.

The isle of Thira, where everything was to begin, was where everything had once come to an end. In the year 1450 BCE, it had been the locus of a volcanic eruption, one so great it not only vaporized the core of the island itself, but spawned the earthquakes and tidal waves that brought the Aegean Golden Age to a cataclysmic close, and gave rise to legends of lost Atlantis.

What little remained of Thira might have gone on slumbering in the Mediterranean sun forever, save that in 1967 the ruins of the ancient Minoan seaport of Akrotiri had been discovered there, entombed like Pompeii beneath tons of lava and ash. With new inscriptions being unearthed almost daily in the ongoing excavation, Thira became a magnet for Linear A scholars from around the world. Including, in the mid-seventies...

Jeremy Bonaventure, ink still drying on his doctorate in classical civilizations, was eager to try his luck in the hunt for the Minoan equivalent of a Rosetta Stone. Crete was only to be a brief stopover en route, until he met the guide the Cretan Antiquities Administration had assigned him.

Ariadni Kalimanakis was a raven-haired beauty almost thirteen years Jeremy's junior. A first-year archaeology major interning that summer at the museum in Iraklion, she had, thanks to her excellent English, been stuck with the job of babysitting a shy, bookish American.

Marianna smiled in her half-sleep at the unlikely pair, the scion of San Francisco society and the Greek fisherman's daughter, touring the palaces at Knossos, the dig at Taras—anywhere and everywhere the tablets, door lintels, and other artifacts bearing traces of Linear A were to be found. It was mid-July before they finally boarded a packet-boat for the day-long trip to Thira.

Ariadni remained lost in thought all through that long afternoon, but by the time they docked she had made her choice. She knew full well it could spell ruin, not only for her own reputation, but for the honor of her family. Yet over the past weeks she had grown to love

Jeremy for his gentleness, his breadth of mind, his depth of spirit. And she was not one to deny her deepest feelings, no matter the cost.

At sunset they left their pension and wandered up into the gentle, grassy hills above the village of Emborion. There, on that warm July night, with the full moon a shield of beaten silver rising out of Homer's wine-dark sea, she gave herself to him.

It was a love story Marianna had heard again and again, told in less and less sanitized versions as she grew from childhood to adolescence. Told in exotic accents by a mother young enough almost to be an elder sister. In Marianna's youthful imagination, this mythos, set at the fountainhead of a romance that still quietly infused her parents' lives, came to take on the dimensions of an ancient archetype, of mysteries already old when the first Aegean civilization was fresh and new. Once she grew old enough to have the biological details more or less sorted out, she used to fantasize that she had been conceived on that first moon-drenched midsummer night.

Against all expectations, for all their differences of age and origin and temperament, Jeremy and Ariadni had made a life together. A life together filled with joy and learning, twin legacies they had bequeathed to their daughter, their only child. A life together tragically cut short on April 17<sup>th</sup> 1993, when they chanced to be on Hellenic flight 803 from New York to Athens.

Marianna rolled over and checked the clock on the nightstand again. Half-past three, and she had to be up by six. Up and back on the job, back trying to salvage what she could from the wreckage of her investigation, from the wreckage of her life...

The crash investigators were never able to determine if it had been a suicide mission or just a run-of-the-mill hijacking gone terribly awry. All they had to go on were the screams and curses—and the echoing gunshots—on the cockpit voice recorder. That, and the physical evidence strewn across a mountainside in Switzerland: 613,786 twisted pieces of Boeing 747, ranging in size from a tabletop down to a matchbook.

The two people Marianna had loved most in all the world. Who had loved each other more and better than anyone she'd ever known. And all of a sudden they were just—gone.

A hard lesson for someone only eighteen years old—for anyone, at any age: don't even try holding on to those you love. You can't.

Love dies.

In the waters off the island of Thira, where everything had once begun, everything came to an end. Marianna stood alone at the stern of her grandfather's fishing boat and scattered the ashes of her mother and father wide across their beloved wine-dark Aegean. No ceremony. No prayers. Nothing.

Nothing but a single truth.

Love dies.



Yuri Vissarionovich Geladze had no eye for understated elegance, else he could not have failed to discern it in *Rusalka's* spacious, high-ceilinged headquarters suite with its varnished, quarter-sawn anigre paneling and matching leather-topped desk. Or in the graying, ruddy-faced man seated behind that desk, draped in a caramel Lanvin blazer, its golden highlights complementing his cream-colored shirt and matching silken cravat. In the whole room, the only item that looked out of place was a distorted metal cylinder, no longer than a pencil and perhaps twice as thick, resting in the man's manicured hands.

"You sent for me," Yuri said. Not a question, merely a statement of fact.

Arkady Grigoriyevich Grishin, CEO and Chairman of the Board of Grishin Enterprises International, seemed not to hear. His fingers continued stroking the engraved surface of his talisman. For long moments still his gaze was held by the scene out the panoramic window to his left: a flotilla of small boats, their sails aglow in early morning light, wending their way upriver toward the gray towers of a suspension bridge. It was with seeming reluctance at relinquishing the view that Grishin sighed, pushed his chair back, and looked up.

"Ah, yes, Yuri. Thank you for coming so quickly." The voice was quiet, cultured, pitched just above a whisper.

Yuri nodded impassively.

"To begin..." Grishin leaned back in his chair, and favored Yuri with one of his dazzling smiles. "Permit me to congratulate you on

yesterday's twofold success: a false trail for CROM and their lead investigator dead, all at once."

Yuri permitted himself a tight smile. "Two flies with one slap," he said.

"Yes, exactly. Ah, of course, Postrel'nikova herself is to learn nothing of this action on her behalf. Not even Sasha can be told."

That didn't merit a response. It wasn't as if Yuri had, or sought, any social contact with the Project's chief scientist or its head planner.

"In any case," Grishin went on, "that is not why I asked you here. It seems another matter has arisen. Merkulov's people have been tracking it for some time. I had been waiting for them to make some show of initiative on their own, but then..." Grishin's handsome, regular features rearranged themselves to hint at a frown. A jewel-encrusted ring sparkled as his tanned hands pantomimed an indulgent helplessness. "Well, you know Vadim."

"Yes." Yuri shrugged. One might as well wait for some show of initiative from a stone as from Vadim Vasiliyevich Merkulov. The GEI security chief's energies were directed, first and foremost, at protecting his own fat ass. It was, in fact, Merkulov's continual reluctance to do the necessary that had led to Yuri's engagement in the first place.

"Then *this* arrived." Grishin looked down at the warped metal object resting in his hands. "Apparently the matter is more critical than we had thought. I fear you must miss tomorrow night's gala in consequence." He sighed as if breaking this sad news to an honored guest. "Vakhtang will coordinate security in your stead. Please brief him on the status of in-transit and on-site arrangements. But do so quickly. You must leave within the hour; there is a long way to go, in little time."

Grishin nodded at the travel documents on Yuri's side of the desk. Yuri took them and glanced over the itinerary: New York to Moscow to Krasnoyarsk to someplace called — Tunguska?

"And here," Grishin handed him a sheet of thick, creamy paper, folded over twice, "is your subject." In situations such as these, Grishin exhibited a certain delicacy: he would not speak the name of the victim in the presence of the assassin.

Yuri unfolded the sheet. Clipped to it were several color images — full, three-quarter, and profile shots of a thin, middle-aged man



wearing a t-shirt, jeans jacket, and an American cowboy hat. The paper itself contained a single line of type. Unfamiliar English words, transliterated into a Cyrillic approximation.

Yuri sounded it out slowly: “Professor Dzhek Adler. University of Teksas.”



As the old Mikoyan-3 helicopter rattled its way into the heartlands of the Stony Tunguska, Professor Jack Adler’s faded blue eyes drank in the vista he’d come so far to see.

When he really got fired up, Jack’s forty-something, borderline-ugly face—a little too narrow in the jaw, too thin in the lips, too broad at the forehead—radiated an intensity that made him seem almost young and good-looking. And right now he was wholly transfigured by the scene passing before his eyes. For, through gaps in the successor-growth canopy, he could see all the way down to the forest floor. Down to where the old forest lay strewn at the young one’s feet, its rotting trunks all aligned radially inward, pointing like thousands of directional arrows toward the epicenter.

Toward the secret heart of the cosmic mystery of the millennium.

They would not be following the path pointed by those arrows today. Instead, the copter was skirting the Great Swamp’s southwestern perimeter headed for Kulik’s Landing. By craning his neck, Jack could just make it out up ahead.

From the air, the landing on the banks of the sluggish Khushmo River hardly looked like the base camp for this year’s high-tech Tunguska expedition. More like a pioneer outpost, and a deserted one at that. Its scattering of rude log structures stood baking in the ninety-five-degree heat of a Siberian midsummer afternoon, silent and seemingly as forsaken as they had been throughout most of the seventy-odd years since the explorer Leonid Kulik had first built them. Only a pall of woodsmoke gave any evidence of human habitation.

The pilot set the Mi-3 down gingerly, as if the ground might buckle beneath its runners. Not an unreasonable concern: the permafrost that started just a meter below the surface had suffered incalculable stresses in the 1908 impact. That was almost a century ago, but who could say if

the oddly fragile stuff was fully healed even now? Better safe than sorry, especially when burdening the treacherous substrate with the weight of a helicopter under load.

One major component of that load was strapped down right beside Jack. He directed a look of mixed affection and chagrin over at his inseparable traveling companion: a bulky black hardshell equipment case marked *Fragile* and *Property of U. Texas, Austin*. It was resting innocuously on the floorboards for now, but, soon as the rotors spun to a stop, the fun of moving it would begin all over again. Not a prospect Jack relished: the thing had to be half the size of his desk back at the Austin physics lab, with a mass nearly the equal of his own hundred eighty-five pounds.

Hauling this monster across thirteen time zones to the remotest spot on earth had taxed Jack's strength and endurance near the limit. And he hadn't had all that much to start with. Tall and stringy and slightly stooped, he was not what you'd call an imposing physical specimen. That shouldn't have mattered much: theoretical physics was supposed to be one of those inside jobs with no heavy lifting. Not this time.

With a grudging assist from the pilot, Jack manhandled the unwieldy case out of the hatch and eased it down to the ground alongside the rest of his luggage. He clamped his trademark ten-gallon hat tight down on his head against the downdraft as the chopper lifted off for the return trip to Vanavara.

And left Jack all alone. He looked around, then down at the case. Was he supposed to lug the thing into camp by himself, in this heat? He couldn't leave it sitting here, that's for sure. Without the SQUID, the half-million-dollar instrument nestled safe inside the hardshell, there'd be no hope whatsoever of proving the far-out theories of one Dr. John C. Adler, mad cosmologist. With it well, let the Doubting Thomases beware!

Speaking of Doubting Thomases, Jack's heart sank as he spied the one-man reception committee now emerging from the main lodge and lumbering toward him through clouds of gnats. Jack recognized that burly giant from the snapshots plastered all over the Tomsk University website: the organizer of this year's expedition, the man who'd done

his level best to block Jack's participation in it: Academician Medvedev himself.

The man's name, Jack recalled, came from *medved*—Russian for “bear.” It sure fit. Professor of Planetology and Member of the Russian Academy of Sciences Dmitri Pavlovich Medvedev bulked tall and broad, barrel-chested and big-bellied in a way that bespoke muscle rather than flab. An unruly black mane threaded with gray reached almost to his shoulders, a match for the scraggly beard, mustache, and brows that framed his sneering mouth, bulbous nose, and glittering black eyes.

“Academician Medvedev.” Jack held out his hand and launched into standard Russian first-contact protocol: “*Ochen' priyatno*. Very pleased to meet you. I am—”

“I know who you are, Adler.” Medvedev brushed aside the niceties, along with the handshake. “And I wish I could say *I* were pleased to meet *you*. But, frankly, the only thing that would please me would be for you to return where you came from. Better yet, for you never to have come here at all.”

“I can understand your reservations about my research program, Professor, but I—”

“Research program?” Medvedev's face reddened alarmingly. “What research program? You...you eat our food, drink our water, consume our fuel, occupy space that might instead have gone to a scientist,”—he did not quite say a *real* scientist, though that was what his tone implied—“a scientist with at least some prospect of advancing our knowledge of the Tunguska phenomenon. Instead, what have your American dollars bought you? The privilege of wasting our expedition's time and resources on your...” The Russian waved his outsized hands in the air, momentarily at a loss for words to describe the enormity of it all, then exploded: “...your discredited fantasies!”

“Black holes aren't fantasies, Professor. If theory alone doesn't convince you they exist, the evidence from the Hubble galactic survey certainly should.” Ever since the late nineties, the Earth-orbiting Hubble telescope had been beaming back images of gargantuan black holes infesting the hearts of nearby galaxies and slowly swallowing them whole.

“Bah!” Medvedev's arm slashed the air so ferociously Jack could feel

the wind of it on his face. “No one doubts such monstrosities are real. But how could one of these have impacted the Earth without utterly destroying it, and the rest of the solar system, too?”

Jack sighed. “Black holes can come in all sizes, Professor.”

“Yes, yes,” Medvedev broke in again, “you will have an entire week in which to recount these fever dreams to any who will listen. I, for one, will not stand here being eaten alive by these infernal insects while you prattle on!”

And with that, he turned on his heel and stomped off in the direction of the camp, leaving Jack alone with the SQUID once more.



“Déjà vu all over again.” Yogi Berra’s immortal one-liner drifted through Marianna Bonaventure’s head as Compliance chauffeured her down John Street in the direction of the South Street Seaport. The same street where, less than eighteen hours ago, her quarry had... No, she’d promised herself she wasn’t going to get into that.

The cafés and storefronts lining the narrow street seemed subtly different today: sharper, realer, more fully dimensional somehow. Was that a trick of the clear mid-morning light, or just the way things always looked when you weren’t focused on the chase to the exclusion of all else? Not that this present operation wasn’t a pursuit, too, of sorts.

The Secure Terminal Unit beeped twice. Marianna was already reaching to jack in her headset when she remembered she wasn’t wearing one. Whole different look for this op: body armor, adieu. Business casuals were lots more comfortable.

“Bonaventure,” she said into the handset.

“Marianna? Pete. Listen, I’ve been thinking...” Uh-oh! She could feel her boss beaming his heavy-jowled frown at her all the way from Chantilly, Virginia. Pete was having second thoughts.

“Relax,” she told him, “we’re good to go. I’m moving to acquire as we speak.”

“It’s too tight on time, is what worries me. We don’t even know if Bondarenko will take the bait.”

“Already covered. As far as Sasha knows, he’s been in contact with the Archon resource for the past three days.”

“He’s *what*? You know damn well you can’t involve a civilian without authorization!”

“Take it easy, Pete. It’s done, okay? And it worked.”

“Marianna—”

“Look, we wouldn’t have had time to set up the email spoof if we’d waited till we’d lost Galina first.” Slow down, inhale. “We’ve only got the one shot at this, what with the gala being tomorrow night. We had to have all our ducks in a row before *Rusalka* sailed. You get that, don’t you, Pete?”

Pete wasn’t saying anything. Not a good sign.

“I knew you wouldn’t buy into it,” she went on, “so I just went ahead and did it. You’ll see; this is all going to pan out.”

The silence on the other end of the secure line was growing uncomfortably long. Pete could still pull the plug, and she couldn’t buck a direct order. C’mon, Pete, think it through. It’s not like you wouldn’t have green-lighted the Hail Mary eventually—you’d have just been too late.

“Okay,” he said at last. “Make it work.”

“Pete, you won’t regret it.”

She hoped.



“*Dio mio*, Jack, my arm hurts still!” *Dottore* Luciano Carbone slumped down by the campfire and rubbed his shoulder demonstratively. “That box of yours must weigh a ton. Why in God’s name did Medvedev make us drag it all the way out to *choum* seventeen?”

“Why do you think, Luciano?” Jack Adler grinned at the tubby, balding University of Bologna geologist—the only friend he’d made in his first half-day on site. A friend in need, too. If the little Italian hadn’t lent a hand, it would have taken all night to get up and running. Even so, it was well past the dinner-hour before they tramped back in, sweaty and exhausted, from what had to be the remotest *choum*, or birchbark tepee, in the camp.

The Italian stroked the black curls of his goatee. “That man does not like you so much, is what I think, to put you so far away.”

Jack chuckled. “I’m not exactly his favorite guest researcher, am

I? But there's a simpler explanation for sticking me out in the boonies. Hear it?"

He cupped a hand to his ear. Sure enough, the faint *chuff-chuff-chuff* of his diesel-powered compressor was audible even at this distance.

"That unit's going to be cycling on and off day and night just keeping the SQUID cold enough to operate," Jack said. "And getting a good night's sleep out here isn't all that easy as it is, what with the skeeters and such. No sense my adding noise pollution to the problem."

Luciano opened his mouth to respond. A cough came out instead. Understandable, since he was directly downwind of the smoky fire. At first Jack had wondered why they were sitting around the campfire at all. It sure wasn't for warmth; Siberian summers might be short but they made up for it with extra helpings of heat and humidity. Turned out, though, that the woodsmoke kept the ravenous Siberian mosquitoes—"flying alligators," the Russians called them—at bay. It was the one deterrent that worked. Conventional bug-spray only served to encourage the insects.

"Sorry, Jack, sorry,"—cough, cough—"what I wanted to say: perhaps the real reason our esteemed Academician has isolated you from the rest of the party is for fear of infection."

"Quarantining my contagious ideas, eh?" Jack smiled again. He liked this rotund, genial little man with his cherubic face and sly Machiavellian wit. "Don't worry, Luciano; from what I can tell, my 'discredited fantasies' aren't catching."

"Because you do not trouble to explain them." Luciano stifled another cough. "Your theories, I mean, not your fantasies. I have read the abstract of your research proposal twice, but I confess this business about the very little black holes still remains a mystery to me."

"Didn't seem much point going into detail, seeing how our friends from Tomsk were going to take the money and run, regardless." As the premier center for studies of the Tunguska phenomenon and the host institution for the expedition, Tomsk University had final say on what research might be conducted at the site.

Jack swiped at the air with his Stetson, beating back another insectile assault wave. "And close their ears to what I had to say in the process," he added.

“Not all of them, perhaps.” Luciano flicked his eyes off to Jack’s left.

Jack turned to see a young blond Russian standing five feet away, listening to them. And looking at the Stetson. What was the real attraction here: Jack’s theories or his cowboy hat?

Caught eavesdropping, the young man blushed and pushed thick bifocals back up his nose. “Excuse, please... Zaleskii, Igor Andreyevich, aspirant in molecular biology at Tomsk University. I could not help but to overhear...”

“No harm done.” Jack said. “Sit down, Igor, pull up a stump and join the party.”

The newcomer gave a grateful nod and joined them at the fire. He squatted down, looked both ways, then reached into his hip pocket and pulled out a metal flask. “Russian mosquito repellent,” he said, handing it to Jack with a grin. “For internal use only.”

Jack unscrewed the lid and took a sniff. Vodka—what a surprise. He glanced at his watch: if he’d managed to keep pace with all the time-zone changes, it was past ten in the evening. At any reasonable latitude, the sun would’ve been over the yardarm hours ago. Even here the sky was beginning to stain with sunset. Close enough.

“Thanks.” He took a swig and passed the flask back to Igor. “So, what’s a biology grad student doing on this junket?”

“I assist Professor Nakoryakova with her studies of trace radioactive isotopes in local soils and flora.” Igor sipped at the flask and handed it to Luciano. “Other than the physical evidence of treefall and the like, residual radiation is the most persistent signature of the Tunguska Event. But please, I did not wish to interrupt. I, too, am interested in what you say about your little black holes. Are they very different from the big ones?”

Jack shrugged. “Depends. What do you know about the big ones?”

It was Luciano who finally replied. “They are said to form when a star grows so heavy that it collapses under its own weight.”

“That’s good, but it’s not the whole story. Maybe it’s better if we back up a bit, begin at the beginning. And, for a black hole, the beginning is gravity.”

Jack downed another slug from the passing flask. The vodka did

seem to be keeping the mosquitoes at bay. Or maybe he was just noticing them less.

“The thing of it is,” he went on, “gravity’s just not very powerful, as forces of nature go. Compared to the strong nuclear force, it’s the next best thing to nonexistent. Even plain old electromagnetism’s got it beat hands down. You ever pick up a three-penny nail with a toy magnet? Then you know how even a teensy bit of electromagnetic force can overcome the gravitational pull of the whole Earth.”

Jack shook his head. “When you get right down to it, the only thing gravity’s got going for it is, it just keeps on adding up.”

“But is this not true of the other forces as well?” Luciano asked.

“Not really. The nuclear forces are too short-range to amount to much over the long run. Electromagnetism’s got the reach, all right, but it comes in opposing flavors: positive and negative charges, north and south poles. That puts a natural upper limit on how strong an electromagnetic field can get before it attracts enough opposite charges to neutralize itself.”

“And gravity, you are saying, only works one way?”

“Uh-huh. Never lets go, never cancels out. That’s unique for a long-range force, and ultimately it’s decisive. Pack enough mass into one place—like in a planet ten times the size of Jupiter—and the field-strength at the core exceeds anything electromagnetism can stand up to. The electron shells that give things their structural strength, why, they just up and buckle. What started out as nice, solid matter—like this,” Jack rapped his knuckles on the log he was sitting on, “dissolves into a soup of dissociated electrons and free nuclei.”

“And so this is how you make black holes?” Igor said.

“Not quite. No, what I just described—” Jack pointed up through the branches to where the first faint pinpricks of light were just beginning to appear in the darkening sky, “—is how you make *stars*.”



Knox had been at his desk and sitting on his hands half the morning, waiting for normal business hours—or Mycroft’s peculiar definition of them—to begin.

The country of the night is the coder’s true homeland, and Mycroft,



a loyal native son. In the fresh, clean hours after midnight, with the petty interruptions and annoyances of the day fading like dreams at dawn, he essayed prodigies of system design, assembling soaring fairytale architectures of logic, elegance, and power from the dry dust of global variables and reserved keywords. But it did make him a devout late sleeper.

Knox flicked his gaze to the timestamp in the corner of his wide-screen: 10:25. Give it another five minutes.

His speakerphone emitted a muted chirp.

“Mycroft?” Calling in early? That would be a first.

“Front desk,” the voice of Archon Office Manager Suzanne Ledbetter corrected. “Were you expecting a visitor, Jon?”

“Unh-uh. My calendar’s clear far as I know.”

“Well, you’ve got one. Take a look.”

A small conferencing window popped up on Knox’s screen, offering a real-time view of a young woman in casual dress. She was standing at the reception desk, communing with her wristtop. Knox zoomed the window to full-screen mode. Did he know her? She didn’t look like someone he would soon forget. She looked... striking, the way that dark hair complemented her ivory complexion.

“I don’t know her,” he said finally. “Not that I wouldn’t like to. Did she say what she wants?”

“What who wants, Jonathan?” A second voice broke in, issuing from the new conferencing window now staking out its own piece of screen real estate.

“Oh, good morning, Mycroft.”

Knox didn’t need to ask how the night’s researches had gone. If Mycroft’s sly grin weren’t enough, his computer-enhanced imagery—the black eyepatch and rakish red bandana, the Jolly Roger fluttering against a backdrop of sky and sea—all betokened a successful hack.

“Jon?” Suzanne again. “What should I tell her?”

Oh, right—his unscheduled visitor. “Uh, I could be tied up with this for a while. See if she wants to hang out, or maybe come back after lunch, okay?”

“Okay.” The reception window irised shut.

Knox turned back to Mycroft. “Took you long enough.”

"I trust you will find it well worth the wait, Jonathan."

"The wait got old an hour ago."

"Yes, well, I'm afraid it must get a little older. There are a few preliminaries to cover first."

"Can 'em." Knox pulled his chair in and leaned forward. "Get to the good stuff."



Half a world away, Jack Adler was getting to some good stuff of his own. He peered through the smoke of the campfire at the expectant faces of his listeners, thinking how best to put it across.

"Stars are really just controlled gravitational implosions," he began. "Take that super-Jupiter we were talking about. Once gravity overcomes its structural integrity, it starts to shrink. It'd go right on shrinking, too, except compression generates heat, and enough compression'll heat the planet's core to upwards of ten million degrees Kelvin. That's the flashpoint: at that temperature, the free atomic nuclei are moving fast enough to start slamming into each other. The strong nuclear force takes over and thermonuclear fusion kicks in."

No matter how many times Jack told this story, he was always struck anew by the wonder of it. "Fusing hydrogen into helium releases energy. Colossal amounts of energy. Enough energy to push back against the pull of gravity. Enough to light the heavens. Enough to warm the worlds and spark the chemical processes that lead to life, to us.

"Enough to make stars," he breathed. He paused again, looking up. This sense of awe was as close as he got to what, he supposed, other people felt in the presence of the sacred.

A hush fell over the little group. No sound stirred the still, warm evening air, save for an occasional pop from the fire.

Jack shook himself. "Of course, things can't go on like that forever. It takes fuel to keep those fires burning—hydrogen, in particular. The average star holds enough to chug along for billions of years, converting hydrogen to helium. But sooner or later it's got to run out. And, when it does, the squeeze starts all over again."

Once it resumed, gravitational contraction would raise the core temperature back up to where the fire rekindled. Only now the helium

“ash” itself became the fuel, fusing into heavier and heavier elements: carbon, lithium, oxygen, neon, silicon, finally bottoming out with iron. Then, nucleosynthesis having reached the point of diminishing returns, the stage was set for the final act.

“At the very end there, gravity can grip hard enough that the core of the star just... collapses.” Jack stared into the campfire, seeing instead the cataclysmic last moments of a dying sun. “Collapses so fast it rebounds. You get a gigantic explosion, a nova or supernova. The star puts out more energy in that single instant than it did in a lifetime of steady shining. The shockwave is powerful enough to transmute elements wholesale.” In its spectacular death throes the star would seed the universe with the building blocks of new worlds, new life.

“In the aftermath,” he went on, “the key thing is how much of the star’s original mass the explosion leaves behind. If it’s only around a sun’s worth, no problem: atomic nuclei have got more than enough structural strength to hold up under that much weight. You wind up with a brown dwarf star the size of the Earth.

“But go upwards of that, and things start to get interesting.”

Jack looked up. Three more expedition members, two middle-aged men and a younger woman, had come trooping in from the twilight forest and were walking purposefully toward the firepit. They gave Jack a perfunctory nod but continued talking quietly among themselves. Not here for the soapbox seminar, then—just more refugees from the gnats.

“Please go on, Jack,” Luciano said. “You were saying?”

“Oh, right. Well, if the leftovers weigh much more than the sun, things start to happen. The pressure in the interior of the “cinder” is enough to mash electrons and protons together, so you get neutrons. That triggers another collapse, into a neutron star only a few miles across. Bizarre enough in its own way, I suppose. But the point where us relativity theorists really sit up and take notice is when the supernova remnant is more than three times the mass of the sun. Not even neutrons can hold back that much gravity; they just up and cave. And neutrons are the last line of defense. Once they go, the whole mass collapses to what we call a singularity—a dimensionless point of infinite density, infinite space-time curvature, infinite you-name-it.”

“Now you go too far, Adler,” a rumbling bass broke in.

Jack turned and saw Medvedev’s great bulk looming just beyond the circle of firelight. “Oh, good evening, Academician,” he said. “I didn’t see you standing there. I’m sorry, what did you mean, ‘go too far?’”

Medvedev sighed in seeming exasperation. “As everyone knows, the infinite is purely a mathematical construct. It can exist nowhere in nature.”

“Maybe not for material objects and such. But gravity’s different. When you get right down to it, gravity *is* mathematics—geometry to be exact.”

Medvedev said nothing, just stood there glaring at him.

“Look,” Jack went on, “imagine that our three-dimensional space is a two-dimensional sheet of rubber. Then gravity’d just be a measure of how much that rubber sheet stretches when you drop a mass on it—a little for a marble, a lot more for a bowling ball. Drop a planet-sized mass onto that rubber sheet and the nearby surface’ll dip down to form a gravity well, one so steep it can curve the path of a moon into orbit around it. Drop in a sun, and you’ve got a deformation deep enough to trap a whole family of planets.”

“This much I grant you,” Medvedev said. “Still, I hear in it nothing of your supposed infinities.”

Jack held up a hand. “Hang on, I’m getting there. Turns out when a really massive star dies, it can form a sink-hole so deep that the well-walls wrap around and pinch shut, sealing off its remains from the rest of space-time. Remember *Alice in Wonderland*, where the Cheshire Cat vanishes, leaving only its smile behind? Well, here, all the matter disappears, collapses to a point, and only the mass is left. Enormous mass, taking up zero room. I don’t know about you, but that sure sounds like infinite density to me.”

Jack glanced at Medvedev, but the big Russian was back to holding his peace, at least for the moment. That was okay; it would only take a moment to finish this up.

“If there are no further questions,” Jack said, “then there’s only one more thing to add. Namely, that while all this is going on, the gravity gradient is getting steeper and steeper. Until it’s finally so steep that nothing, not even light, can escape ...

“... Which is why we call them black holes.”

“Very nice, Adler.” Medvedev was smiling through his beard now. “A pretty story, but it has been told before. Two hundred years ago, the Frenchman LaPlace imagined ‘black stars’ with escape velocity greater than the speed of light. Why not be so good as to share with us the fruits of your own intellect instead.”

“Well, these aren’t really *my* ideas, you understand,” Jack said. “But the fact is, supernovas aren’t the only way to make black holes. Every mass has its own cosmic point of no return—a lower limit on its size called the Schwarzschild radius. Beyond that, gravity takes over and collapses it down to a singularity. Shrink any mass small enough, and you get a black hole.”

Medvedev smirked. “Even, perhaps, this?” He bent over abruptly. When he straightened again he was holding out a small lump of river-rounded rock.

“Huh? Yeah, sure,” Jack said, eyeing the pebble. “Though it’d be easier to visualize if we start with something slightly larger. The Earth, say.”

“By all means, choose what example you will.” The Russian eased himself down opposite Jack, keeping the fire between them.

“Okay, well, Earth’s Schwarzschild radius is about one and a half centimeters. So, if you could put the whole planet into some humungous vise and crush it down to a one-inch sphere, it would become a miniature black hole.” Jack looked Medvedev in the eye. “With me so far? This is all just plain-vanilla relativity.”

“No one disputes what you say, in theory,” Medvedev bristled. “But where is the actuality? Show me this fantastic vise, this ‘Schwarzschild machine’ of yours. Let me create a singularity myself, purely as an experiment. Then I, too, will believe.”

“You know that’s impossible. The pressures needed are unimaginable, beyond anything we can even dream of today.”

“Hah!” The Russian turned to his colleagues with a told-you-so grin.

Jack sighed. “But that doesn’t mean it’s *never* been possible. There was more than enough radiation pressure in the first instants of the Big

Bang to spawn PBHs—primordial black holes—of arbitrarily small size. And, as you know...

“Yes, yes,” Medvedev said, “I know only too well: it must therefore have been one of your famous PBHs that caused the Tunguska Event. All the generations of scientists who have struggled to understand this phenomenon of the Tunguska Cosmic Body are fools, fools or worse—futilely scouring the taiga for a meteorite that never existed. So claim the Three Wise Men from Texas University: Jackson and Ryan and Adler.

“But, Adler,” Medvedev went on, “I say it is *you* who are the fool, coming all this way in pursuit of what was known to be folly when first published thirty years ago.”

“Known? What do you mean known?”

“Simply that if your compatriots Jackson and Ryan had troubled to acquaint themselves with the geophysical evidence—evidence gathered painstakingly over the years by *serious* researchers—they would never have put forward their preposterous idea in the first place.”

“Believe me when I tell you,” Jack said, “that I’ve gone back and forth over your geophysical evidence, what little there is of it: seventy years of expeditions and you still haven’t got a clue what the thing was. Was it a comet? A meteor?” He shook his upraised hands in mock dismay. “We don’t know, we can’t tell. Let’s just call it a TCB, a ‘Tunguska Cosmic Body,’ and have done with it.”

A frown crossed the Russian’s broad features. “But this is standard scientific nomenclature—”

“Face it, Medvedev: calling the thing a TCB is an admission of defeat. It says you don’t know what you’re talking about, that your so-called ‘evidence’ is full of holes, inconclusive in the extreme. Except, of course, in those instances where it actually lends support to the Jackson-Ryan hypothesis.”

“Support?” Medvedev snorted. “To what support do you refer?”

“Well, take the geomagnetic storm that Irkutsk Observatory tracked for hours following the impact. That effect could easily be accounted for by the right type of primordial black hole. At the same time, it just about rules out your own candidate for the Tunguska Cosmic Body. You guys from Tomsk have been pushing the TCB-as-comet theory for

as long as anyone can remember. But comets aren't magnetic—they're mostly made of ice."

"A meteorite after all, then," Igor put in, to Medvedev's evident displeasure.

Jack turned to him. "Okay. Only now you're stuck explaining away another key piece of geophysical evidence: no crater. By Medvedev's own calculations, his TCB would've been the biggest thing to hit Earth in fifty thousand years. And base camp here can't be more than a mile or so from the epicenter. So why aren't we sitting at the bottom of a hole the size of the Grand Canyon?"

"As is well known," Medvedev said stiffly, "the lack of a crater is due to the event having been an airburst."

"An explosion kilometers up, resulting in *complete* volatilization of a meteoric body?" Jack said. "Sorry, I don't buy it. All right, maybe, if it was a stony meteorite. But you need a *ferrous* meteorite to explain the magnetism, and there's just no way that much iron could totally self-destruct."

He shook his head. "No, when you add it all up, the airburst theory begins to look like just another circular argument: the strongest support for it is the thing it's supposed to be explaining. 'No crater? Okay, then, must have been an airburst!' Call that evidence? Give me a break!"

"I see no reason why we must sit here and listen to this, this—" Medvedev began.

But Jack wasn't done yet, he'd saved the best for last. "And let's not forget who started this whole airburst business. One of Kazantsev's crackpot theories, wasn't it? That's some strange company you're keeping, Academician."

No one spoke. The only sound was the crackling of the campfire. Igor sucked in his breath but said nothing. Luciano choked on a laugh and covered his mouth with his hand. Medvedev glowered, his eyes far redder than could be accounted for by the pungent woodsmoke.

To so much as mention the mountebank Kazantsev in the same breath as the revered Academician was nothing short of scandalous. For it was Aleksandr Kazantsev who, fresh back from a 1946 inspection tour of the Hiroshima devastation, had startled the world with the claim that the 1908 Tunguska catastrophe had resulted from a similar

high-altitude nuclear explosion — the explosion, in fact, of a nuclear-powered spaceship from Mars!

Medvedev had lurched to his feet now, and was standing there hunched over, still not speaking. The firelight cast his distorted shadow huge against the wall of Kulik's old cabin. In its eerie glow he bore the look — eyes widened, teeth bared — of a beast baited almost beyond endurance.

Jack wasn't about to back down. "Take your pick. Whichever hypothesis you choose, there's always some piece of your 'geophysical evidence' guaranteed to undermine it."

For a moment Jack thought the Russian was going to leap the firepit and attack him physically.

Instead, in a voice shaking with barely-checked rage, Medvedev bellowed, "Yes? Well here is a piece of geophysical evidence I invite you to explain, Adler: your lack of a so-called 'exit event.'" He drew a deep breath. "If your ridiculous theory were true and the TCB were in truth one of your micro-holes, nothing could have prevented it from boring down through the Earth and out the other side, true? Your friends Jackson and Ryan said as much, predicting that it would come rocketing up out of the North Atlantic shortly after its touch-down here. Their 1973 *Nature* article, in fact, offers this retrodiction as a test of the whole hypothesis."

"Aha! So you *have* read it then."

"Oh, do not look so surprised, Adler. Of course I have read it. I enjoy science fiction as much as the next fellow." Medvedev smiled tightly. "But, here is my point. If your 'micro-hole' could cause such devastation on landing here in Tunguska, how could it not do so again on erupting up out of the ocean on the other side of the world?"

"Well—" Jack began.

But there was no stopping Medvedev now. "It should, in fact, have raised a catastrophic tsunami, not so? Vessels in the Atlantic shipping lanes should have been capsized by the shockwave. A wall of water fifty feet high should have gone crashing against the shores of Iceland and Eastern Canada — areas far more densely populated than Central Siberia, then as now. Why then do the newspapers of the time contain no reports of such a disaster?"



The Russian leaned closer, teeth bared in an unpleasant grin. “I will tell you why, Adler. *Because it never happened!* None of it did. To think otherwise is the worst sort of naïveté and scientific irresponsibility!”

All eyes were now on Jack, waiting to see how he would respond.

Jack chose his next words carefully. “Remember your Sherlock Holmes? The one where he says ‘Once you’ve eliminated the impossible, whatever remains, however improbable...’”

“Must be truth,” Medvedev finished for him, “Yes, yes, this is well known. But what is your point?”

“Just this,” Jack said in a low voice, “I don’t think the thing ever came back out.

“I think it’s still in there.”