

Boundary Condition by Wil Mccarthy

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Illustration by Vincent DiFate

Very old and very new ideas can come together in unexpected ways....

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We saw in the vale below us a whirlwind beginning in the road, and shewing itself by the dust it raised. Riding close by its side, I tried to break this whirlwind by striking my whip frequently through it, but without any effect. The circular motion was amazingly rapid. I accompanied it about three quarters of a mile, till some limbs of dead trees, flying about and falling near me, made me more apprehensive of danger; and then I stopped, looking at the top of it as it went on, which was visible for a very great height above the trees.

--Benjamin Franklin, 1755: "To Peter Collins"

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Space, Near Future

Death comes upon us in surprising ways. If it didn't, we'd arrange to be somewhere else, right? And in the wake of death we find an obsession with time. When did this happen? When did it start? How long have *I* got left? But whose time should answer these questions? Whose calendar and clock?

On a space station in low-Earth orbit, there are no easy answers. The Sun comes out every 90 minutes and stays for 47 before sinking back behind the limb of the blue-green planet below, and the station passes through 25 different time zones along the way. For sanity's sake, Russian stations set their clocks to Moscow's "Charlie" time, three hours fast of Greenwich, England. The Chinese are synched to Jiuquan's "Foxtrot" zone, and the handful of truly international stations are on Universal or "Zulu" or Greenwich Mean Time. London, in other words.

Where death comes upon Americans in space the situation is more complex. If you work for NASA, you log absolute time in two zones at once: Zulu and Romeo, which might stand either for Cocoa Beach where the rockets actually launch, or possibly Washington, D.C. where the checks are written. It hardly matters, because the routing of voice and telecom through Building 30 at Johnson Space Center makes these outposts a mobile extension of Houston, Texas.

The Air Force stations, on the other hand, like to keep it simple. It's Zulu time and metric units, never mind where you came from or where you think you're headed. And for some reason, the two fledgling space hotels--little more than boxcar-sized inflatable hot dogs--follow the military paradigm.

On the *other* other hand, should you be lucky enough to work for the National Weather Service--a.k.a. "Not Wet, Sir" if you like them or "Nitwit Circus" if you don't--you live on Sierra time. That's Omaha, Nebraska, son, and don't you forget it. The spaceplanes take off and land on the runways at Eppley Field, and the tracking network is headquartered just seventeen kilometers south at Offutt Air Force Base. Even the checks are written locally; between its subscription-only news network and its weather control services, its multimedia archives and its growing tourism business, NWS is officially self-sustaining, and may soon be handing a surplus back to Uncle Sam.

In olden times it was glamorous hereabouts to be an aviator, or to work for the railroads, or even

(strange to imagine it!) to be a humble letter carrier for the Pony Express. For now it's the men and women of the Weather Service--most especially the Stormbreakers--to whom these envies accrue. Thousands of hopefuls move here every year with the dream of signing up, though fewer than twenty are accepted.

So, never mind that in low-earth orbit the Sun rises and sets 16 times a day; on an NWS station your morning is the Nebraska Cornhuskers' morning, and your evening occurs as the Sun slips down behind the lone tower called "Prick of the Prairie" and settles into an ocean of Tango-zone corn and buckwheat.

Wave to Headquarters as you soar high above; the city is instantly recognizable even from orbit. Surrounded by that grassy ocean, Omaha's southwestern edge has, in recent years, finally blurred into the outer fringes of Lincoln. Its eastern frontier encompasses the city of Council Bluffs, Iowa. But sail a little farther and you're in the open sea, where the cornstalks outnumber the human beings twenty million to one. Where the nearest civilization is 225 kilometers away, and it's only Des Moines. So if the Gate to God isn't exactly the most cosmopolitan city in the world, you should understand in all fairness that it doesn't need to be.

Oh-MA-ha, the locals call it, when they're in a mood to chuckle. The Big Island.

It was with great secrecy--disguised as dull routine--that a particular spaceplane lifted off from this site, this place in the middle of no place, and lit an Orbital Insertion Motor that flung it hard toward an NWS station speeding 500 kilometers overhead.

"Relief vehicle away," said a bored-sounding flight controller. "Tell Dewey Park their replacements are *en route*." It was a half-truth at best, but a half-lie at worst. The National Weather Service is nothing if not pragmatic.

But this young man was in on more secrets than his managers supposed, and while he spoke there was a dead body cooling under his desk--the first of many who would lose their lives in the coming spasm of transformation and realignment. The why of this is difficult to explain even now, though the where and when and how are little in doubt. But in some sense the motive for murder--even mass murder--is always the same: to control the future by removing people from it.

1.

Shuttlerise

Catskin. Iceland Spar, medium. Hand and Bladder Glass. Magdeburg Hemispheres. Lodestone. Tantalus Cup.

--"Apparatus and Material for Experiments in Physics", *CRC Handbook of Chemistry and Physics*, Cleveland, Ohio, 1913.

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"Onigiri," said Tomohiro Sato, holding up one of the sticky rice balls he and Chip had been whipping up in the galley these past few weeks. They were the size of small peaches, and with a bit of salty fish paste in the center, they were *good*. They also held together in zero-g, making them the only decent way to eat rice up here without a godawful mess.

"Rice ball," answered Jiminy Gomez, wondering what the zinger was this time. Tomo--a famous weatherman in his own country--was here on Dewey Park Station to learn the delicate art of the Free Will Index forecast, and he seemed determined to teach something of comparable value in return: the art of the bilingual pun.

"Nigiri means 'squeeze,'" Tomo explained, as they drifted through the gray-white pressurized tunnel connecting the trailing sensor arm to the station core. "With your hand, right? To form the rice into a ball." His accent wasn't perfect, but it was good; only the pacing really betrayed him.

"Okay, so what's the 'O'?"

Tomo waved the question away. "Unimportant. Means 'elegant.' You stick that on a lot of words. Shiri means 'ass,' right? 'Oshiri' means *derriere*. Much nicer."

With that, Tomo tossed the rice ball to Jiminy, who'd had six long months in zero-g and caught it easily. He eyed it *uneasily*, though. Where was the gag?

"You like?" said Tomo. "Go ahead, eat it. Exercise your free will."

Hmm. Jiminy could feel the ghost of a punchline out there somewhere, but he didn't have enough information yet. He was going to get zinged. Again.

"Please tell me this has nothing to do with your ass."

Tomo laughed. "Not this time. But you eat that thing, it means you owe me a debt. The word for that is *giri*, and if you take that off you're left with *oni*, which means 'goblin.' *Oni giri*, the debt owed to a goblin."

Jiminy made sure Tomo could see him rolling his eyes. "They call you the Weather Wit? Really?"

"Ah," said Tomo, waving that away, too. "You spoiled my rhythm. You know how you say 'Jim knows a little Japanese?' *Jim wa nihongo hanashimasu.*"

As Tomo said this, he turned in mid-air and touched his finger to Jiminy's nose at the word "knows," and again at 'hana,' which was the Japanese word for nose. A double-entendre? A triple? A bilingual triple entendre?

"Hmm," he said, thinking that one over. Clever was not quite the same thing as funny.

They passed through the final hatchway--about as wide as a standard doorway back home--and into the station core. It wasn't much; just a bus-sized fiberglass habitat module--the Hab--serviced by a spiderweb of rollout carbon trusses and inflatable Kevlar tube tents. Dewey Park covered as much footprint as an aircraft carrier, but inside it had the volume of a midsize submarine, and only weighed as much as a Lear Jet.

If the two NASA stations were Cadillacs--classy, rugged, and safe as houses--then the three NWS ones were more along the lines of an Indian Tata. That is to say: flimsy, maintenance-hungry, and cheaper than their own weight in gasoline. If Jim really wanted to, he could puncture the Hab wall with a ballpoint pen. But hey, that was life in the Service. With a big job and a small budget, they simply couldn't afford to be too cautious.

"You want to hear an actual joke?" he asked Tomo. "I'll tell you a joke. You know the Pope?"

"Personally? Okay, okay, yes, I know who he is. You just got a new one, right?"

"The Catholics got him, yeah. Not me personally. Anyway, he was just crowned: Dave the First, the American pope. And he's supposed to go to New York City to catch a plane to Rome, so they pack him in this bulletproof Popemobile, and he's surrounded by bodyguards. One of them's driving, two are in the back seat, one's on the roof.... And it suddenly dawns on old Dave that these guys will be on him like

glue for the rest of his life. Never a moment alone.

"Buuut ... just as quickly he realizes he's the boss here. These guards have to do what he says. So he says to the one who's driving, he says, 'Slide over. I'm taking the wheel.' And what can the guy do? He slides over, and Pope Dave starts driving."

"Uh-huh," said Tomohiro, crossing his arms like this was already the worst joke he'd ever heard. He was slowly tilting, too, which in zero gravity was a subtle way of dissing someone. If you were interested, you didn't drift; you kept yourself aligned with the person you were listening to.

But Jim pressed on. "So anyway, it's not built like a normal car, and he's not used to the controls. He's wandering in and out of his lane, can't hold a constant speed. Pretty soon the cops pull him over, so he rolls down the window like a good citizen and hands over his driver's license. And the one cop says to the other cop, 'Holy shit, we've got to let this guy go. He's *really* important.'"

"What makes you say that?" says the other cop. He's not looking, right? He's filling out paperwork. And the first cop turns to him and says, 'I don't know who he is, but he's got Pope Dave for a fucking chauffeur!'"

Tomo processed that for a few seconds, then spent another few trying not to laugh. But it *was* a good joke, and it broke out a decent chuckle.

"See?" said Jiminy. "That's a joke. Now if you'll excuse me, I've got to find my headset in time for dock ops."

"Oh. You should hurry," Tomo said. "We don't really have that long."

Jim slid open the fanfold of his cabin, which was about the size of three coffins stacked vertically. (How much space did one person really need? Especially in microgravity?) He drifted to the back and commenced rummaging, finally locating his headset in the webbing of his top desk drawer. Safety and command protocols aside, he didn't normally wear the thing indoors. It chafed and squeezed, and after enough hours it would turn his whole ear red. This one was dead, of course--he was always forgetting to turn it off--so he swapped in the battery waiting fresh on the charger, then slid the whole thing down over his head and right ear, carefully adjusting the microphone to the proper angle and distance from his mouth. The headsets had literally come from Radio Shack, and were *damned* flaky about things like that.

Finally he switched it on, and was greeted by the chatter of Bob Cass and Lisa Goho in the control cupola at the "top" of the Hab, i.e., the part facing away from Earth. Opposite the docking module, so they could guide the shuttle in with minimal risk of being personally crushed by it. Bob was the station commander, Lisa was the X.O., and both of them were pilots. Indeed, they would be flying that same shuttle back to Earth tomorrow afternoon.

"Aaah, closing rate 3.6 meters per second," Lisa informed the channel flatly. "Recommend another deceleration toot."

"Aaah, roger that," said an unfamiliar voice--the shuttle's own current pilot. "Be advised, we are still lining up the final approach. Expect a burn in approximately fifteen seconds."

It went on like that for some time. The "Aaah" was to trigger the mics in voice-activated mode. Without it they would step on the first second or two of actual speech, with sometimes-calamitous results. It was an old and effective method for talking hands-free on a half-duplex channel, but it did pretty much make them sound like retards. "Better radios" were always high on the NWS Astronautics wish list, but you know, good radios were *way* more expensive than the ones that could just barely get the job done. The

astronauts had offered many times to buy the radios themselves, out of pocket, but that was seen as a bad PR move. "Next year," the brass kept promising. They couldn't turn a profit, after all, by spending money on frills.

Robert and Lisa had CNN running up there in the cupola as well. This struck Jim as both disrespectful and a wee bit dangerous, but then again he himself had never been more than an air tanker copilot. NWS space pilots were all former Stormbreakers, almost impossible to fluster or distract. They'd spent long hours of their lives in thunderheads and hurricane eyewalls, dropping surfactant or sealing oils, shutting down the weather's engines of rage. Space station duty was positively dull by comparison.

So in the background Jim could hear that the President was in Louisiana, where the Chinese Premier was speaking out not only against biodiesel (which in his opinion was full of turkey prions and therefore more deadly than nuclear waste), but also against prayer and meditation, which "rob us of the very freedom of our souls." Uh-huh.

"You guys had better get down there," advised Chip, the Station Engineer, from the galley niche where he was assigned this shift. He was glumly washing the dishes one-by-one, in a plastic bag filled with soapy water. Everyone knew it was a duty he hated. But he was also wearing a headset, and apparently keeping closer track of the dock ops than Jiminy himself. "You've got, like, two minutes. If you're lucky."

"Shall we?" Tomo asked, gesturing at the deck hatch located directly beneath the sealed control blister. Their own mics were in push-to-talk mode, so they couldn't step on the channel by mistake.

"Yeah," Jiminy agreed, swiveling head-down so he could grasp the hatch's locking ring. Balletic movements like that were second nature to him by now, but the thrill had long worn off. Being a spaceman was fun, and the bleeding edge of a new science was always a good place to park yourself. Just about everything he did up here was a major contribution in one way or another--he was one of the world's first quantum weathermen; his place in history was assured. Nevertheless, he was ready to be *home*, to eat cheeseburgers and smell fresh-cut grass again, and he had a hard time believing his escape was really imminent. Surely *something* would screw it up. But just as surely that something would not be Jim Gomez himself, so he grabbed the ring, planted his toes under a pair of holding rungs, and twisted the latch open.

Tomo then helped him raise it without banging it--there were no cushioning pneumatics here--and then slipped into the docking module feet-first, like a cold-weather diver going down through a hole in the ice. Jim followed behind, headfirst but with his feet curled up against him. He pulled the hatch down after him and sealed it, while half-audibly in his headset, CNN boasted of "Yet another upset for Green Bay!" and then cut to a laxative commercial.

It was gray-white in here. The docking adapter was mostly thin plastic, which was *frightfully* reassuring given the larger-than-normal spaceplane barreling toward it at what looked like higher-than-normal velocity.

"Holy crap!" Jim said, putting his face up against one of the portholes. "What the hell is that thing?"

"It's the 210," Tomo answered, with his own nose pressed up against the other porthole below Jim's. "Fresh off a line at General Spaceplane."

"Really? Already? I thought the first one wasn't due until next year."

"Might be the prototype. Look, the thing has been modified. Cargo bay looks bulging, and those aren't the stock bay doors. They look like blowaways. And what is that *thing* behind the docking collar? Is that a reentry vehicle? Some kind of escape pod?"

For a weatherman, Tomohiro Sato knew an awful lot about spaceplanes. It was why the Japanese government had sent him here, Jim supposed, and why the NWS had accepted him.

"Is he coming in a little hot?"

Tomo shook his head. "I don't think so. It just looks fast because the shape is more ... well, I don't think so."

Jim watched the nose thrusters firing little puffs of white steam, like the pipes of an old calliope. The oversized craft slowed, and slowed some more.

Jim's headphones said, "Commander Cass here, to all Dewey Park personnel. I am suddenly informed that this is not a standard relief mission. We've got some sort of VIP in there. You've all got active clearances, right? Because as of this moment, everything that happens until that shuttle leaves is classified Confidential under diplomatic seal."

There was a clank, as the shuttle's docking ring made contact with the larger adjustable ring on the station's dock module. Tomo kicked on the electromagnets, and Jiminy immediately started cranking the physical clamps shut, so an errant puff from the shuttle's attitude motors couldn't pry the two vehicles apart at some not-so-funny angle. Within moments, the seal was airtight and very strong; the ship and the station were one.

"Docking clamps at full compression," he said, slapping the push-to-talk on his belt.

"Aaah, roger that," Bob Cass replied. "Please equalize pressure and stand by while the hatches open."

The "please" wasn't so much a courtesy as an NWS radio convention, indicating that what followed was an order rather than a recommendation or an info request.

"Roger that," Tomo replied, twisting the valves open partway. Once he was satisfied they weren't sucking vacuum, he opened them fully. They hissed for a moment and then fell silent.

Jiminy could see Tomo itching to open the hatch as well. Properly speaking, it was the station crew's job to open this side, and the shuttle crew's job to open the other. Tomo was just as impatient as Jim to get back to Earth, a process that obviously could not begin without an open hatch. But in NWS jargon, "please stand by" was roughly equivalent to "sit down and shut up," and left no room for personal initiative.

Below, there were squeaking and banging sounds, as of locking wheels being rotated and doors being opened. But whoever was down there, they were taking their own sweet time about it.

"VIPs," Jim snorted. "The last one we got here was *you*."

"I was a VIP?" said Tomo, sounding surprised. "It's funny, the service hasn't been that good. I mean, who do I have to sleep on to get a beer around here?"

"Sleep *with*," Jim corrected helpfully; he also considered himself Tomo's Gutter English tutor. "We've been over this. And you really should work the phrase 'the living fuck' into it somewhere."

Jim was hanging upside down when he said this, and as luck would have it the hatch chose that precise moment to swing open, with a person's head prairie-dogging up right behind it, so that the word "fuck" was breathed directly into the face of Dewey Park's mystery visitor. And this turned out to be a *really* bad way to start off the morning, because the face belonged to none other than His Holiness, Pope Dave the First.

"Bless you!" the pontiff returned brightly, as if excusing a sneeze.

2.

Divine Wind

Only in recent years have aerologists given much attention to the slow-moving currents of the lower strata of the atmosphere. In what way can this best be done?

--*Popular Science Monthly*, July 1915

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There was some initial shock while the Pope and his attendants filed up into the station one by one. This mission had been planned in such secrecy that even Robert--the station commander!--didn't know, and didn't believe it when told. Heck, at first he didn't even believe it when the Pope and his attendants floated up out of the docking module right in front of him. Truthfully, it *was* hard to recognize Pope Dave at first glance; Tomohiro hadn't, and neither had Chip. After all, "His Holiness" was wearing a perfectly ordinary NWS flight suit, albeit with the pressure helmet detached, and he was also surprisingly short, which was something you didn't get from seeing him on TV. In gravity, the top of his head would come no higher than Jim's nose, and Jim was barely five foot ten! Pope Dave's only concessions to his station were a heavy gold ring of some kind, and a flat white cap, like a Jewish yarmulke, bobby-pinned to the crown of his head. And those could mean anything, really.

But the face was familiar, in the way that famous faces always are, like an old teacher from your past, or some friend you haven't talked to in a while. It was the attendants who really cinched it, though; in jet-black coveralls with some yellow-white European flag on the breast, with feathered caps and wraparound sunglasses flickering with numbers and text and diagrams, they looked like some weird, twenty-first-century version of the jacks in a deck of playing cards. At the sight of them, Jim had flashed on a title: Swiss Guard. That was about the extent of his knowledge of Vatican culture, but he was sure he'd seen these guys on TV or something.

Any lingering doubts were demolished when Barney Hopper, the Pilot Commander of the shuttle and, up till now, a stranger to Jim, came up through the airlock and made the formal introduction: "His Holiness Pope Dave, Bishop of Rome and, uh, Sovereign of the Vatican City ... I forgot a bit there, didn't I?"

"No matter."

The station crew stammered out a number of fragmentary questions, which the Pope answered with smiles and a disarmingly deep sort of patience. Yes, he really was who they thought he was. Yes, he'd had a pleasant flight, not nearly as rough or as crushing as he'd expected. Yes, the weightlessness agreed with him just fine. He'd done two days' training on the NWS Vomit Comet before coming up here, flying up and down and up and down again in zero-g parabolic arcs, and no, thank you, he didn't need a motion sickness patch. He then turned to the guards and said something in German, and they replied tersely in Italian, or perhaps Latin, shaking their heads. No, they didn't need medication either.

The Swiss Guard had that same unflappable look you saw with Secret Service agents left out in the sun, or in veteran cops surveying a nasty crime scene. They were uncomfortable, yeah, but so what? The job came first. Except for occasional reaching to the cabinets and Hab wall for stability, they managed to stand more or less at attention, and to look cool doing it. Which was no mean trick in zero-g! By contrast, the Pope himself did seem a bit puffy and dazed.

He also radiated an infectious sense of peace, though, which Jim distrusted immediately. Religious people often carried themselves this way; with the calm of absolute certainty. Jim, for his own self, had never felt

that certain about anything, including death, taxes, and the falling of a second shoe after the first one had dropped.

"Listen," he said diplomatically, "I don't mean to be rude, but Chip here needs to get down in that shuttle and find the card pullers you guys were supposed to bring up. You did, right? And since we're coming up on North America again for the start of our daily readings, I've got to cycle the sensor arrays and strap in."

"The life of a weathercock, eh?" said the Pope with mild amusement. Was that a dirty joke?

"The Earth keeps turning," Jim agreed guardedly. "The weather never stops."

"Very true. I have to say, young man, I'm honored to live in such privileged times, and to meet such pioneers as yourself. This is *God's* weather you're talking about--a frontier for scientists and theologians alike."

Jim shrugged. "It's always been there, sir. And if I'm going to measure it on schedule, I'd best step lively. Will you excuse me?"

To which the Pope just smiled again, placing two fingers on Jim's arm. "Actually, your readings are exactly what I'm here to observe. You're Jiminy Gomez?"

"Saint Jim," said Lorraine Kennet, hovering in the airlock hatchway. "God's own private secretary these past six months. How you doing, bud?"

Now that struck Jim as very rude, for two reasons. First because he didn't believe in God, or that kind of God anyway, and second because the Pope obviously did. Shooting a glare at Kennet he said, "I've asked you not to call me that. I'm a meteorologist."

"No one has suggested otherwise," the Pope assured him. "And I shouldn't allow my presence to interfere with your important schedule. But I'd like very much to accompany you and watch the process. I have a thousand questions already!"

"Sure," Jim said slowly, because what else was he going to say? The guy was a VIP; if Jim didn't show him around voluntarily, he'd do it under orders.

At this point, the commander piped in with a, "Take Saint Lorraine with you, too."

Lorraine Kennet was Jim's replacement for the upcoming six-month rotation. She'd be taking over tomorrow, just as soon as Jim stepped aboard that shuttle. And she was bloody welcome to it.

Twenty minutes later Jim was strapped into the telemetry chair at the station's geometric center, and Saint Lorraine was lowering a colander-shaped cap down over his head, like they used for executions in the electric chair. This one wasn't a simple metal electrode, though, but an array of two-inch wafers called "gallium arsenide quantum wells," which helped focus the weird subatomic energies storming around here at any given time. There were decoherence sensors all up and down the long arms of Dewey Park Station, but by far the most sensitive detector was Jiminy Gomez himself, whose brain fell far outside the normal human range for quantum decoherence events. That Jim had an above-average IQ was beside the point; there was a lot more going on inside his brain than mere cognition, and in the relative silence of low Earth orbit, these events could be measured very clearly and accurately.

"Ready?" asked Kennet with a look of concern, for she knew better than anyone how disorienting this business could be. She'd only ever done it Earthside, though, and she was wise to observe the process once or twice before assuming full responsibility for it. It wasn't worse up here, but it was ... different.

"Ready," Jim told her, at which point she went ahead and threw the switch. Coils hummed to life around Jim's head, and the base field settled in with a taste like bitter metal in his mouth, and with a vague buzzing sensation the flight surgeons had never adequately explained. The field was D.C., not A.C., and should not "buzz" unless it was interacting with Jim's neurons in some kind of unknown way. He didn't much like that idea, but the weather, as they say, never sleeps. Anyway, between the flight pay, hazard pay, and travel compensation, and the fact that his wife was planning to leave him--or he had already left her if you wanted to get technical about it--Jim considered it an acceptable risk.

"You're like a damn Christmas tree," Kennet observed as the monitor screens began to flesh out an image of his brain, rendered in twinkling points of starlight. This, at least, didn't feel like anything at all. Jim's brain had been decohering all his life, and on the occasions when the events were suppressed by outside forces--by "miracles" if you wanted to call them that--he didn't feel any different. But for whatever reason, he did sparkle brighter and brighter the higher he got from the Earth's surface. It was why he was up here, why all of them were.

"This is free will?" the Pope wanted to know. There was a gleam in his eye--of interest? Of holy terror? "These are small miracles, the thoughts of Jiminy Gomez overpowering the laws of physics?"

"Nothing overpowers the laws of physics," Jim told him firmly but wearily, because he'd answered this question way too many times in the past few years. "These are 'decoherence events,' and they're a natural process, albeit one we don't fully understand. On a much smaller scale, the same thing happens in a quantum computer."

But that wasn't exactly true, and the Pope seemed to know it.

"Listen," Kennet said, "Your, uh, Your Holiness..."

"Please, just call me Dave. David Wayne Stassi. I'm a person, like you."

And that was a bit *too* true, because it was widely rumored that Dave, like Jim and Kennet and a few hundred others worldwide, was a saint. That is, he had a really unusually high DQ, or decoherence quotient. In fact, his was supposedly one of the highest ever recorded.

"I thought you were supposed to change your name," said Kennet. "When you were crowned, I mean. Or mitered, or whatever it is they do."

Pope Dave just shrugged at that. "Knowing I was a reformer, even a radical, the Cardinals elected me anyway. I wasn't the first to refuse the Papal Oath--otherwise known, I kid you not, as the Oath Against Modernism--but there haven't been many of us. And that name thing just stuck in my craw. Why change? Why reinvent myself to fit this role? It was the first of many traditions overturned."

A strong statement, considering Pope Dave had been in office for just under six months. He'd mentioned he was fifty-four, but he didn't look that old; his hair was still black, fading gracefully to silver at the sides. And he'd done that puppet show thing on PBS, and he'd written one or two New York Times bestsellers about psychology or something. The proceeds had no doubt gone to worthy causes, but still he seemed an odd choice to be the Pope.

As if sensing Jim's thoughts, Dave shrugged again and said, modestly, "The Cardinals claim they were divinely inspired. Or if you prefer, they saw me as a man in step with the changing times, and followed their gut. Better the upheaval you know than the upheaval you can only guess at, eh? Or maybe they panicked. I'm not sure *I* would have picked me if the choice had been mine to make, but you know, sometimes the shock of novelty brings us closer to the truth."

"So now you're infallible?" Kennet asked, again rudely. She was one of those people who were determined to behave exactly the same toward all people in all situations. You simply couldn't impress her with titles or credentials, or money or charm or wit. On the other hand, she was just as difficult to offend.

"Ah," said Dave, clasping his hands briefly in a gesture of humility. "You know, there's a lot of disagreement on that point. It's a touchy subject. Some would say that if I screw up, it'll prove I was never the legitimate Pope to begin with. Others would say the *office* is infallible; according to Paul's testimony, Jesus granted him the right to speak for heaven, and to bind it to his word. But even taking that at face value, I'm not Paul. The very concept of Papal infallibility is a modern invention, dating to Pius the Ninth in the late eighteenth century. In my opinion, Miss Kennet, the best I can do is pray for guidance and apply my own judgment. I would not expect that combination to be right all the time."

Kennet seemed ready to work another job in, for fun or curiosity, just to see what might happen. She was a real social scientist, that one. But fortunately the stats were coming in on Jim's decoherence events, and suddenly the anomaly warning was flashing and chiming. Jim looked over the monitors and said, mainly for Kennet's benefit, "Bing, bing. I read negative slope, negative concavity. There's a major boundary condition trying to impose itself here. Type alpha, magnitude 4 or 5, extraterrestrial origin and centroid. Do you concur?"

"Um, yeah. I'd call it around 4.7."

Although it wasn't evident from the picture of Jim's brain, there was a kind of stuttering going on at the quantum level, as external forces tried to suck all the Heisenberg uncertainty out of this volume of space. If not for the human brains here trying to do the same thing on a microscopic level, the decoherence hypercone or "deek" would have succeeded already. In a deek, particles could move or change energy without seeming to. Events could be influenced; outcomes could change. "Miracles," some people called them.

Finally it found its opening: a moment in time when there were no interfering flashes inside Jim's head--or Kennet's, or Dave's, or anyone else's on the station. The results were brief, and like anything involving the word "quantum", they could be interpreted a variety of ways, and visualized only by analogy and metaphor.

Jim liked to picture a major deek as a swarm of hungry bubbles, growing from pinpoints and rapidly expanding to the size of buses, or even whole space stations, before popping and vanishing and being replaced with new bubbles. "Decoherence" was the collapse of quantum uncertainty, and "hypercone" was the shape these events sketched out in four dimensions. "Hungry" was Jim's own term, because what the bubbles wanted was *space*--great volumes of it to expand unimpeded. But no two deeks could overlap, so the presence of a human mind, fizzing with its own little microevents, broke the symmetry and prevented large hypercones from forming. In layman's terms, human thoughts were "stepping on the channel."

The result--the analogy, the metaphor--was a cluster of bubbles clinging to the space around Dewey Park Station, waiting for their moment to pounce. And when the moment came, the bus-sized deeks vanished and were replaced by something much larger. Now it was Jim's own activity that was suppressed; the scanner showed a blank where his brain should be. He was still breathing, still thinking and feeling, still going about his business. He could speak or dance or whatever, and as far as his senses were concerned, nothing had changed at all. Was he really on autopilot? Soulless, a meat machine? The channel was being stepped on by something much larger than himself; according to the instruments, his free will was gone.

The event trying to happen here was somewhere between ten and 100 kilometers across--or sixty-three by Lorraine's estimate--and since Dewey Park Station was hurtling above the Earth at seven kilometers per second, they passed through it in just a few seconds and were out in clear space again, where he was once more the captain of his soul. But then, on the heels of it, came another, slightly smaller deek.

"What miracle is this?" the Pope wanted to know. His eyes were wide, hungry, amazed. "What's changing? Something big is happening here!"

"Not really," Jim told him. "We get these little blips all the time. It's just weather."

A type of weather undreamed of even five years ago. The weather of the soul, some called it. Manna from heaven, the miracle rain. A symphony of quantum decoherence on a cosmic scale, sweeping through the solar system and battering into the Earth like a kind of wind. And if "free will" could be said to exist on the quantum level--if human thoughts could guide and tweak the subatomic processes that gave rise to them--then these storms were of great consequence indeed, for they quieted the brain's "little miracles." They had other effects as well, which a worldwide scramble had so far done little to decode.

"Get the Stormbreakers up there," the President had famously remarked. "If this $\hat{\epsilon}$ quantum wind affects our security I want to see it coming." And here they were.

"Overall," Jim said, now to the Pope, "the trend is down, which is what we'd expect for this time of week."

"Ah. Right, yes. It peaks on Sunday." His eyes had taken back that knowing gleam. Was certainty the enemy of wonder?

Again, Jim felt a flutter of annoyance. "It peaks when it peaks, sir. In the U.S. and Western Europe, it often happens on Sunday, yes. But that's already Monday in Australia. It can happen on Saturday, too, or Friday, or sometimes even Thursday night. I wouldn't read too much into it."

"No," the Pope mused, with a little smile. Sure, because any data Jim gave him would simply confirm his own models of how the universe should work. Anything truly anomalous would be rejected, right? Critical thought was a skill anyone could learn but few people really wanted to. Like knitting. Arguing the point would be sort of interesting--trying to convert the Pope himself!--but with little hope of success and a great probability of pissing off his superiors, Jim opted to ignore it and press on instead with his work.

Which was uneventful, as it turned out. They made it through the rest of the orbit with only three more major deeks, making this a quiet day indeed. Throwing off his buckles and lifting out of the chair, Jim moved to the instrument console and messed with the laptop-style touchpad there, switching between a couple of different window views on the monitor. First derivative, second derivative, absolute magnitudes and station ground track ... Looking these over, Jim thought for only about fifteen seconds before rendering up his forecast. "Projected Free Will Index of 9.2. Call Earth and let them know it's going to be an interesting Saturday night."

* * * *

"You called it a boundary condition," the Pope said. "Not a miracle."

"Uh, well," Jim answered, reaching up to scratch his face and trying hard not to grimace. "It's not a value judgment on my part. I mean, a boundary condition is any point in time or space where certain variables are nailed down. When you start up your car in the morning, its speed is zero. When you park it at the end of the day, it's zero again. In between it might vary quite a bit, but those two zeroes are your boundary conditions. The system is fixed at those points."

They were in the wardroom, the lounge and dining and recreation area of the main Hab, where Jim had gone to recuperate after his ninety minutes of data taking. He wasn't exhausted or anything--the job wasn't *that* hard--but he did need to clear his head and drink a sippy mug of coffee. Pope Dave had followed along behind him, far more dignified than a puppy but no less eager.

"I don't understand," he said. "The words make sense, but I'm afraid I don't know how to apply them."

You could never be truly alone on a station this small, but Kennet was still back in the weather lab, checking out the equipment she'd be using for the next six months, while Chip was off fixing the backup file server and Tomohiro was in his cabin writing an email or something. Robert and Lisa had work to do up on the bridge, and one of the Swiss Guard was up there with them, either watching for danger, watching *them*, or monitoring communications or something. The new shuttle crew was down in their vehicle, powering down flight systems and putting the thing in docking mode, so it could draw from the station's solar arrays rather than its own limited fuel cells. Jim knew from experience that the flight crew had gear to stow, personal effects to unpack, checklists to run through with ground control, and all sorts of other little tasks. They were handing the shuttle off to Robert and Lisa in the morning, but they themselves would be here on station for the next six months.

For the moment, the only person here was the other Swiss Guard, and he was hovering discreetly in the distance, managing somehow to look alert and take in everything without ever really turning toward His Holiness or Jiminy Gomez, or seeming to eavesdrop. So Jim and the Pope were *kind of* alone. Which was a strange experience, definitely.

"Here," Jim said, "I'll show you."

This particular issue had come up so many times that he'd finally written a Java applet to explain it, and posted the thing on his web page. And finding a computer here on Dewey Park station was never a problem. The walls were practically made of computers, so Jim moved to the nearest one and opened up his web page, noting the very slight delay that came from bouncing his request off a communications satellite and down to Earth, and from the return signal following the same path on the way back up. Still, it was only a few seconds before the desired window appeared on his screen, with the heading JIM'S TINYVERSE at the top. And indeed, this Java universe was very small and wonderfully simple: just 10 little dots bouncing around in a black square box. Bouncing off the walls, and each other, in perfectly elastic collisions with no inertia or rotation or other messy physics.

"Can you see this?" he asked the Pope.

"I'm not blind," Dave answered agreeably.

"All right, well, for this run the balls started out in a random pattern. But I can impose any pattern I want, any combination of initial positions and velocities. I can make them start in a particular shape, like a square or circle. Any shape you want."

Amusedly: "How about a cross?"

"Um, sure, I can do a cross." Jim used the touchpad to freeze the simulation and drag the dots around. "Just to illustrate my point, I'm going to use random velocities. But the same rules apply whether we do that or not. Anyway, here's your cross. When I restart the simulation, the balls will all fly apart. See? Now, you ... are you watching them? They're going to ... They're going to bounce around forever, until the end of time. At this point, I don't have any further control over the system. It's running on autopilot, but that cross shape we had at the beginning--that's a boundary condition. We forced that on the system. It's not a variable; we constrained it to behave that way."

"All right. That's a clear enough concept."

"Thing is," Jim said, "we don't have to impose that condition at the beginning, or in that exact spot. We can move it to a different point on the screen, and in exactly the same way we can move it to a different point in time."

He froze the simulation again, slid the keyboard out on its track and began rattling off keystrokes.

"I understand what you mean," the Pope said. What he seemed to imply by that was, You don't have to do this work just to show me. I can probably figure it out from here.

But it was familiar work, not at all difficult, and in half a minute Jim was done anyway. With a theatrical flourish, he restarted the program. "Now watch this clock over here, because in thirty seconds something interesting is going to happen. The balls are still bouncing, right? But I didn't pick their initial positions or speeds this time. Instead, I *calculated* those values to get a particular effect. Are you watching the clock?"

"I am."

The time ticked over: 20 seconds, 25, and then suddenly the apparent disorder on the screen began to vanish, as the dots momentarily came together to form the shape of a cross. And then flew apart again.

The Pope began to laugh. "It's a miracle!"

"It looks like one, yeah," Jim agreed. "Order emerging from apparent randomness. But in fact, this entire universe was constructed to make that one event happen. And I'm a poor substitute for God, because I can only do it once."

The Pope frowned. "Okay, there you've lost me."

"The system is running on automatic," Jim explained, scratching his ear nervously. "If it produces any additional patterns, it'll be by coincidence. I could arrange for that cross to reappear on a periodic schedule, but that's not a miracle either. That's clockwork."

He typed in some more instructions, and soon the cross shape was coming together and flying apart, coming together and flying apart again in an endless cycle.

"If this universe of mine were more complex, if it were shaped differently or if there were nonlinear effects between the balls, then chaos theory would come into play. The motion would be much harder to predict. Also harder to control. I can impose a boundary condition on this pinhead universe with only a handful of calculations. To do it on the real universe, I'd need to know the position and velocity of every single molecule, with absolute precision. My computer would have to be perfect."

"You'd have to be God, in other words."

"If you like. But even then, I could only do it once. If I try to impose a second boundary condition..." Jim demonstrated this by grabbing the dots on the screen one by one, dragging them back into a cross shape and freezing them there. "I have to defy my own laws of physics. The second boundary condition gives me away. If you were an astronomer, I couldn't fool you for a second with this kind of thing. You'd know right away that the universe was being tampered with."

"And it isn't," the Pope said. "Not in that way."

It wasn't a question. Indeed, there was a certainty in the tone that prompted Jim to ask, "How much

astronomy do you know?"

"I was brought up a Jesuit," the Pope said, as though that explained anything. In response to Jim's blank look he added, "Seekers of God through knowledge, and through the realities rather than the ideals of human behavior."

"Oh," said Jim. "Don't those guys run a bunch of universities or something?"

"Prominent ones, yes. The philosopher Tielhard de Chardin belonged to the order, as do many notable scientists today. They're well represented among my advisors. But that's a digression, which keeps you from answering the obvious question here."

Jim quirked an eyebrow. "Yeah? What question is that?"

"How does *God* do it?" The pontiff spread his hands, genuinely anxious to hear Jim's opinion. "Boundary conditions happen all the time. We encountered five of them just now in that weather room, and I saw thousands of little ones pop off between your ears. How do you explain that?"

Ah, the hard cold glare of religion, always searching for chinks in the armor of science, and for methods to exploit it. Still, Jim considered truth to be the stoutest weapon in his arsenal, and he'd never been shy about using it. "Yes, well. There's a whole new science emerging just for explaining that, uh, Dave. And since it's a *new* science, I can't just look up the answer in a textbook and tell it to you."

"But it has something to do with quantum mechanics?"

"Right. And now you know as much as I do."

A chuckle. "Oh, I doubt that very much."

Just then, Robert poked his head down from the cupola and said, "Sorry to interrupt, but Jim, I need you to step outside and retrieve the radiation dosimeters. Flight surgeon wants them for comparison purposes, to measure against our personal badges."

Jim glanced down at his own dosimeter badge: a sheet of laminated white plastic that turned imperceptibly more gray with each passing day, each solar flare and cosmic ray. He smiled grimly and thumped the wall, which flexed slightly like the hull of a fiberglass boat, or like a Kevlar tent wall stretched very tight. "On the theory that this dishrag of a station provides any shielding? That's a nice thought, but I kind of doubt it. Do you want me to go now?"

"Please. You can buddy up with Kennet; she needs the training anyway. With departure ops starting first thing in the morning, I don't think you'll get another chance." Then he turned to Pope Dave and said, "Your Holiness, if it's not too much trouble I'm hoping to speak with you in private at some point."

"Of course," Dave answered, like any man of the cloth. Always ready to give counsel, to hear a confession, to offer such blessings as he could. A doctor for the soul, sworn to help wherever possible. But then he said something that really did draw the attention of the Swiss Guard on the other side of the room. "I'd prefer to postpone it, though. Commander, is there any chance I can go outside with Jim?"

3.

The Stars Themselves

Do not assume more variables than necessary.

--*Summa Logices*, William of Ockham, 1320

* * * *

How do you say no to a request like that? How do you say yes? The Pope had none of the appropriate training, and on a NASA or Air Force station they wouldn't let him *touch* a space suit, much less wear one. But this was the National Weather Service, where safety didn't come first, and anyway Robert's mingled sense of responsibility and deference gave him a lot of leeway.

"Promise me you'll be careful," he'd said to Dave. And a few minutes later, to Jim, in the relative privacy of the command cupola: "If anything happens, Gomez, I'm not letting you back inside. I mean that. I'm Catholic myself."

And Jim could almost believe the threat, and it made him kind of resentful. Why him? Why was he suddenly the babysitter for untrained VIPs? Because the Pope asked for him, yes. Because he could be spared right now, and because he'd done it a dozen times before and knew the dangers well, whereas Kennet had never been in space at all until today. But it was a *huge* responsibility--he could cause a hundred different kinds of international incident--and Robert wasn't asking his opinion.

Dave himself had done so, much to his credit. "I won't force myself on you, son. It's entirely your choice."

Which was still no choice, because refusing would make Jim look nearly as bad as screwing the pooch out there.

"It's no trouble," he'd lied.

So here they were, Pope and Weatherman, side by side in the airlock while the pressure slowly bled down.

"Aaah, what do you do about the itching?" asked Pope Dave, reaching up with a stiff, gloved hand and clawing at his helmet visor in mock distress.

"Aaah, you live with it," Jim told him. Then, because that seemed a little brusque, "It's not so bad once you're outside. More than anything it's the sensory deprivation in here. You get bored, you start looking for things to feel and do and worry about."

"I can smell my breakfast. And my teeth need brushing; I smell that too. I feel like I've crawled inside my own mouth."

"Yup."

Thirty seconds later, "I want to thank you for this. It's a dream come true, albeit a sin I'll pay for eventually. If those cardinals hadn't lost their minds last spring, I'd be on the ground right now with a billion other tourists who can't afford a ticket. Frustrated astronaut that I am, I saw my chance, and I jumped."

"Try to slow your breathing down."

"Ah. Right. I'm a little nervous."

"That's normal."

Another pause.

"You don't like to talk in here, do you?"

"Well, it's a safety issue. Simplex channel, you know, only one person can speak at a time. Chatter could mask a distress call."

"I see."

"It's just a reflex; I don't mean to be rude. Habcom, this is EV1. Are you all right with a bit of chatter?"

Around a burst of static Lisa Goho's voice cut in, "Habcom here. You've briefed our guest on the hand signals, right?" Lisa was originally from England, and had a *gorgeous* radio voice that cut through any amount of static or distortion. Her vowels and consonants were crisp; she got the words out quickly, without seeming to rush.

"Aaah, that's affirmative," Jim answered, in his own run-together Nebraskan.

"Then go right ahead, EV1. It's just me and this guard fellow on the channel, and I've got tank heaters to check. If you like, you can erase the recordings when you get back. For privacy."

"Roger that. Won't be necessary, but thank you."

The other reason, of course, was that chatter was simply more difficult out here. You had to have your squelch and volume set just right, and you had to keep your voice down to avoid blowing out your buddy's eardrum. And you had to trigger the vox with that stupid "Aaah," and you couldn't breathe too hard because that would set the microphones off, too. On the other hand, spacewalking with the Pope was something he could tell his grandkids about, and maybe that was worth a bit of effort.

"You track Satan as well as God, I hear," the Pope said, floating the words out like a straw archery target. "Two kinds of miracles, working at cross-purposes."

Sighing to himself, Jim dutifully took a shot. "We just track forces of nature, sir."

"I know it. And I want to understand what that means. I'm not simply here on a fact-finding mission; I wanted to meet the 'Saints' in their natural habitat, so to speak. I've got five quantum physicists on staff at the Vatican, and we've discussed these matters at considerable length. I've been to MIT, and to CERN, where they're trying to catch these miracles in a bottle. But there the issues are academic, not practical. I want to hear *your* opinion. I want to know how you feel about all this."

In a way, Jim could hear two voices coming out of this man. One belonged to Dave Stassi the human being, and wanted simply to connect and converse in the normal way. The other belonged to an ancient organization still immersed in the pomp and stoicism of Rome. *That* voice had to be careful what it said, even to an outsider like Jim. Even on a private channel. A bishop could maybe take a few liberties here and there, but Jim understood that a Pope simply couldn't speak through cute furry puppets, or comment on the merits of Coke over Pepsi.

In a funny way it made him feel closer to the guy, because the same kind of thing had happened to Jim in his transition from bush-league cargo pilot to respectable scientist. Science had its own voice, too, its own list of things that couldn't be said, topics that couldn't be broached. Like communism, science in the real world never actually seemed to occur in its pure form. Its supporters had their own axes to grind, nests to feather, corners to cut, and whatnot. The solemn weight of science had crushed so many prejudices and superstitions already, it was tempting to heave it at anything offensive. But a real scientist was expected to ignore this obvious truth, to at least pretend his aspirations were incorruptible. They *ought* to be, certainly.

What Jim said was, "An informed opinion requires more information than we actually have. It's important

to be cautious."

"Obviously," Dave agreed. "I'm not trying to put you on the spot, or compromise your ethics in any way. I'm certainly not going to quote you. But you *have* an opinion, informed or not. Can I ask you to share it?"

Well, that was a harder question to refuse. Reluctantly Jim said, "There are ... Look, in a star there are competing forces, too. Gravity wants to crush it; heat wants to blow it apart. Neither one is good or evil; neither one is intelligent, or cares about human beings. That's just how it is. In my *opinion*, sir, these decoherence storms are no more purposeful than the radio beacon of a pulsar. Those were very mysterious, too, when they were first discovered. Now we know they're just the field emissions of a spinning neutron star. I think we'll find something similar in this case, and all the people screaming about God will end up eating their hats."

Pope Dave thought that one over. "Did I misread your paper in *Nature*? That comet really did hit the back side of the Moon."

"It was always going to."

"Are you sure? With two competing forces wrestling over it? After eighty thousand decoherence events wiggling its little molecules, you're sure its course remained exactly the same? Is that what you're telling me?"

Ah. This man was cleverer than Jim had given him credit for. And he was onto something, too, in a way. Werner Heisenberg had proven that the trajectory of a subatomic particle could never be known exactly, because it simply wasn't exact to begin with. There was a built-in slop factor that would let it jump across gaps, or briefly appear to be in two places at once. Indeed, a lot of electronic gizmos relied on this principle.

Jim answered, "I see where you're going with this. And you know, it's not entirely crazy; if the particles in my little universe were Heisenberg particles--if their positions and velocities had some mandatory uncertainty built in--I could wiggle them around without anyone noticing."

"Except that you'd trigger a decoherence," said the Pope. "You push a particle to the *very edge* of its uncertainty envelope, and you pin it there by collapsing the waveform. For just a moment. Bit by bit, you could move mountains that way. Or comets."

"Yeah. I mean, that's not quite ... It doesn't really work like that. I know what you mean, and it's ... well. There's a way to interpret the results which kind of matches your line of reasoning here. Kind of. But I'd be very leery of drawing any conclusions."

"Of course you would."

"Extraordinary claims require extraordinary proof. And you'll never find it."

"No? So we shouldn't even look? Shouldn't even try? That strikes me as the proverbial counsel of despair, Jim. Even if you're right, and there's a little void in the center of science that can only be answered with faith, is that so bad?"

Jim shrugged inside his suit. It was swelling around him, getting stiff, like a blowup doll he'd somehow gotten inside of. "People believe all kinds of things. I don't have a problem with that, as long as they don't come around telling scientists how to do their jobs."

The red light above them finally went out. The green came on in its place.

"EV1, this is Habcom," said Lisa in his ear. "Decompression complete; you're free to open the outer hatch."

"Roger that. Your ... Your Holiness, just, uh, stick very close. I want you to stay in the lock while I clip your tether. Can you do that?"

"Naturally," the Pope answered. But his breathing was faster, shallower. That was bad, because it would fill his helmet with carbon dioxide, which would trick his lungs into breathing even faster.

"Hold on, I'm going to adjust your oxygen."

Tightly: "Is something wrong?"

"No. You just expend more energy when you move."

Which was true.

"Why aren't you adjusting yours?"

"I will," Jim assured him. "I tweak it up and down all the time. For you, I think it's better to set it a little high. We'll only be out here for a few minutes."

"Oh. Is that all?"

"Sure. Just out to the end of the forward boom, and back, and out to the aft boom, and back again. Then we recompress. We'll actually spend more time in the airlock than we will outside."

Jim went ahead and opened the hatch. Sunlight flooded in, which of course caused His Holiness to breathe harder again. This time, Jim let it go. He'd smoke up his tank pretty fast if he kept that up, but as long as the scrubbers didn't fail the tank was designed to last four hours. No problem there.

Moving carefully, he climbed outside, clipped his tether to the safety wire, and then proceeded to untangle Dave's line from his own.

"I'm clipping you now," he said. Click. "Okay, you're done. You can come out whenever you're ready."

Huff-puff huff-puff. The Pope sounded like he was in the middle of a hundred-meter sprint. His head poked out into the sunlight, then turned to face the glow of Earth.

"My God," he said, then rattled off some prayer in Latin. "Such glory. Such incredible glory." He turned again to face the stars, and the tiny crescent Moon hanging serenely in the distance. Everyone said it: the Moon looked smaller from up here.

"We look around us," the Pope said. "Our homes and our cities, our web sites and phones, and we think that's the world. That's creation--God's grand design. We forget the universe that dwarfs us all around."

"Yup," Jim agreed. Here at least he could agree wholeheartedly. Going outside always made him feel that way; it was a great reminder of how small the problems in his life really were. He gave the man a few minutes to look around, to comment in wonder.

"The Moon affects it, too," Dave said at one point. "The phases of the Moon. It seems a funny thing, doesn't it?"

"Something to do with dielectrics," Jim suggested. That was the going theory, anyway. "The Moon is an insulator; it blocks electric fields. When it's new, the Moon is between the Earth and Sun. When it's full,

it's out behind us, out of the way."

"And yet..." the Pope mused. "It's another foolish old wives' tale, isn't it? Another superstition proven correct. The full-moon crazies. Do you know what I think?"

"No," Jim said, because why would he? "We're going to climb thataway, hand-over-hand. Whatever direction you're moving, it's best to think of it as *up*." Then, to be diplomatic, "You can talk to me while you're climbing. Sometimes it helps people stay calm."

"I'm calm," Dave said, a little defensively.

"Sure? All right, then. Follow me."

They climbed for a few seconds in silence. Dave's breathing quickened.

"You were going to share a theory with me," Jim prompted.

"Right. The Church needs to take a position on these matters. It *needs* to."

"How about, â€œno one knows?"

"Aaah, no. It's my duty to interpret these things. Not just to tell the truth, but to imagine what it means, and pray that that imagination is guided by outside truths. It worked for the Greeks; they deduced the atom. They invented geometry. By clearing their minds and dreaming. Scientists today spurn faith, spurn gnosis especially, but they do so at their peril. Where do they think testable hypotheses come from?"

"Hmm." Jim was going to have to mull that one over. "What's your idea?"

"Well, when I was having my DQ tested, I tried a little experiment: I prayed. And for those thirty seconds, my decoherence rate dropped close to zero. Returned to normal when I finished. I understand meditation has a similar effect."

"I've heard that," Jim agreed. It was anecdotal evidence--no one had done a rigorous study of it yet--but he had no reason to disbelieve it.

"And deeks can't overlap. Something in the construction of the universe forbids it."

"That's true. You doing all right back there?"

"Fine. Thank you." Though his breathing was very rapid, Dave pressed on. "That means free will prevents God from acting. Prevents Him from decohering the space you occupy. Our mere presence deflects miracles."

"Um, okay." That was five times more mystical than it needed to be, but not fundamentally wrong.

"Unless we pray. You see? Prayer is an act of surrender. It quiets the storms inside us, literally creates the opportunity for God to act through us. In exchange for a few moments of our free will."

Jim couldn't help laughing at that. "Ho. Well. That's an interesting belief, sir. But if it were true, your prayers would empower the other side, too. Satan could operate through you just as easily as God. The holiest thing you could do would be to pray on a full-moon Saturday night. That's the most free will you could ever hope to surrender, right? But not to God: to anyone. In theory, even a human being could generate miracles large enough to affect you. Just press your heads together! I don't think so, sir. I really don't."

The Pope had no answer to that.

Jim began to feel guilty. Was it his job to demolish this poor guy's belief system? No one had all the answers--least of all Jim Gomez. If you asked him, the whole God thing was a coin toss: the universe *was* rich and complex and *did* give rise to thinking, feeling creatures. Cosmologists insisted this was the result of a delicate balance of fundamental physical constants; tweak any of them even a little bit and the whole thing would have collapsed, or stayed a cloud of hydrogen forever. Supposedly the universe was going to blow up, in like 40 billion years or something, but didn't everything have an end? The amazing thing to Jim was that there should be all this stuff in between.

There was no particular reason it should be so unless (a) there were a very large number of universes, all with different values for those magic numbers, and *this* universe, however rare and wonderful, fell somewhere in the natural range. Or, (b) the whole place had been constructed deliberately, for the express purpose of creating complexity and intelligence. Either answer was fine with Jim, and if someone could devise an experiment to prove it one way or the other, he'd accept it and move on.

Theology was not a real science, but there was a time not long ago when meteorology wasn't, either. You didn't perform experiments; nature did. You could look at other planets, or rare weather events here on Earth, and you could cobble up computer models--Tinyverses grown massive and wildly complex--and throw all kinds of weird conditions at them. But that rarely taught you anything new, and it didn't predict the rain.

But in the Stormbreakers' era every wall cloud was a laboratory, every hailstorm and tornado an empirical indictment of shoddy methods or failing equipment. NWS predicted the weather, yes, and then they *did* something about it. In his younger days Jim had wandered from physics to engineering to pilot school, then back to the ground again when his left eustachian tube stopped clearing properly and made every flight a pain in the ear. He'd found meteorology by accident, while running the clock out on his Air Force enlistment. And *loved* it.

Later, he'd found flying a desk at the Service at least as thrilling as anything the rest of the world had to offer. With the click of a mouse he could fire a hell of microwaves up at the ionosphere, heating and raising it, lowering the barometric pressure underneath and sucking in storms to deflect them from croplands or at-risk population centers. *That* was a miracle. And when he'd turned out to be a "Saint" as well, the Service had dusted off his physics training and sent him right past the weather, to heaven itself.

Looking down now at the Earth, he could see a tropical depression out over the Atlantic, and a cold front rolling its way across the east coast of Africa like a line of cotton-balls aflame in the sunset. The Sun was over America; everything east of Liberia was already in darkness.

"Let's pick up the pace a little," he said to Pope Dave. "The Sun's going to set in a few minutes."

"Oh," said Dave. "Will it be cold?"

"Like winter driving with the heater on. You'll feel the cold, but you won't *be* cold. It'll be dark, though."

He had reached the end of the boom by now. Retrieving the dosimeter was a simple matter of unclipping a bracket, slipping the thing out and into a leg pocket, and replacing it with a fresh one from the same pocket.

"Can you see this?" he asked the Pope. Because even the dullest tasks seemed mysterious and wonderful when you did them in vacuum, with the unblinking stars all around and the lights of Earth flaring beneath you. Jim's first spacewalk--also known as an "extravehicular activity" or EVA--had been with Chip: a repair mission to splice a damaged cable. The thirty minutes they were out still ranked among the most

vivid in his life; since then he'd done longer, harder EVAs, and they'd all been magic. But nothing could match that first-time intensity. And fear.

"I see," Dave acknowledged breathily. "Thank you."

"No problem, Your, uh, Your Holiness. Now, it's time to go back the other way. Do you want me to climb over you, or would you rather go first?"

"Could I? Lead? I'd love to. And call me Dave, please. I mean that. You're not of my flock; my titles should not compel you."

So they started back. Or started to start back, anyway; as luck would have it the Sun chose that exact moment to slip behind the planet and cast them into darkness.

Said Lisa, "Uh, Jim, I thought you might like to know. Kennet's down in the chair right now running system diagnostics, and she's reading a big jump in activity. A *big* jump."

"Roger that," Jim answered. You couldn't feel a deek, couldn't tell when a boundary condition was slapping you in the face. Not that it mattered, especially. "I'll keep it in mind."

"Whoa," the Pope said, somewhere ahead in the darkness. Then, more emphatically, "Whoa! I'm slipping, I'm ... I can't feel my hands on the rail!"

Jim reached out and grabbed for Dave's foot, which was right where it ought to be. His eyes needed time to adjust, but to the extent he could see anything by starlight and moonlight, the Pope seemed to be still clutching the ladder, as before. And even if he weren't, the safety wire would catch him. And if that somehow failed, Jim had a jet bottle with him and would effect a rescue. And if *all* of that somehow failed, the whole station could be moved to a slightly different orbit, which would intersect the paths of its wayward astronauts.

In the movies you could lose your grip and fly away forever; in real life you were still co-orbiting with the station, and it would take a big, big rocket motor to get you up to escape velocity and off into deep space.

"It's vertigo," he said, in his best EVA-buddy tone. "Just close your eyes and breathe deep. Lisa, kick on the floodlights, please."

They *should* have come on automatically, but with the shuttle drawing power from the station's batteries, maybe the power management system was trying to cut corners. For good measure, Jim flipped on his suit's own headlights.

"Oh. Damn," he said a few moments later.

After that, everyone tried to speak at once.

"Help! [*puff, puff*] Jim, help me!"

"*Papa, stai bene?*"

"Floodlights inoperative. We may have tripped a circuit--"

"--falling--"

"--*cadendo?*"

"--twisted in the wire or something--"

"--your status. Please advise--"

"Ich wusste, dass wir nicht ihn draussen gehen lassen sollten. Help him, idiot!"

Jim tried three times to get a word in, but the channel was bursting with traffic. The Pope was a mess, too, struggling in the jumping shadows of Jim's lamps. He'd fallen forward into a loop of his own tether, then tried to jerk free or something. Then things had gone really wrong, and now he was tangled so badly that his arms couldn't reach the rail. He had one boot tucked underneath, and he was pretty much dangling by that, and reaching in vain for a handhold.

"Clear the channel," Jim said, repeating it five times so it had some chance of getting through. Then: "Dave, you're all tangled up. Hold still, please. Hold still. I've got your foot."

"The lord is my shepherd, I shall not want. He maketh me to lie down in green pastures..."

"Be quiet, please."

"He leadeth me beside the still waters..."

"Stop it!" Jim said, shaking the Pope's foot for emphasis. "You're not going to fall away. Do you hear me? You're not going to fall away. You *can't*, and if you somehow do, I'll catch you. Okay? Just relax."

"Sorry. Sorry."

"Just relax." Jim moved as far forward as he could without getting his own tether's carabiner caught up in the tangle. Examining the situation, he bit back a curse. Because to unravel this puppy he was either going to have to roll the Pope a few revolutions to port, or he was going to have to unclip the harness. In fact, he'd have to unclip it anyway. Damn. That did make a bit of a safety problem. Still, the worst thing to do in a crisis—even a minor crisis--was nothing at all.

He moved forward a bit more, getting his head and shoulders up over Dave's feet, then unclipped the carabiner. Without saying anything, he unwrapped it from around Dave's oxygen pack, then solemnly wound it underneath him until he could free the loops around the pontiff's arms.

"I'm slipping," Dave said at one point.

"I still have your foot," Jim assured him. Of course, he was working one-handed and hanging on by his own toes, but he saw no need to bring that up. Just two more turns, pulling the carabiner through here and through there ... and it was done.

Except that Jim's own tether, floating loose and slack, had gotten mixed in there somehow. Now *it* was looped around the ladder and knotted to itself, and how the hell had *that* happened? Dave's wire was wrapped up in it, too. It was like a bloody miracle, this ability of strings and wires to snarl themselves without help. The thing was probably just two quick moves from freedom--a pull here and a tuck there--but which two moves? Jim couldn't see them. So, sighing, he unclipped his carabiner as well. Twist, twist, and now both cables were free, as easily as that.

"I'm *really* slipping," the Pope warned.

Jim was just about to hook the two carabiners back onto the guide wire when Dave suddenly lurched, and twisted, and floated free of the ladder. And so did Jim.

And suddenly Jim was terrified, because he and the Pope were tangled up in a knot of their own--a human knot--and they were a meter from the ladder. A meter and a half. Two meters!

"The lord is my shepherd, I shall not want..."

"Quiet. Please."

"He maketh me to lie down in--"

"Shut it! That's not helping!"

But the Pope couldn't hear him. Now they were spinning a little, too, and the ladder was still retreating from his grasp, centimeter by centimeter. Damn! Making no effort to hide his curses now, he grabbed Dave by the backpack and rotated him firmly out in front.

"Hold still, hold still!" he growled. Why was he so scared? He knew exactly what to do, and even if he somehow panicked completely, Lisa was guiding the station, and *she* knew what to do.

Indeed, Lisa's voice cut briefly through the channel with, "--whether you require assistance, EV1."

"Negative, negative," he tried, his voice tight with fear.

The Earth and stars wheeled by slowly, and when the rotation had brought them back around again, Jim hurled the Pope back toward the ladder, not hard but firmly. Dave floated back in a straight line, sans rotation.

"Aaah, grab on tight!" Jim commanded, repeating that several times to make sure it got through. And whether Dave heard or not, he surely complied, grabbing the ladder hard in his gloved hands the very moment he could reach it. He then surprised Jim by retrieving and inspecting his tether cord, sliding his hand up to the end, and clipping the carabiner back on the guide wire again.

"--you all right up there?" someone asked around a burst of static.

"Just shut up for a minute!" Jim snapped. Per Isaac Newton, that push to Dave had just added half a meter a second to Jim's own velocity; he was getting farther, faster. Still, there was little question what to do next. Working slowly and carefully, he got out his jet bottle and took a *very firm* hold of it against his center of mass. If he lost it now he was screwed, so he cradled it, aimed carefully, and waited for his moment. When it arrived, he pulled the trigger for nearly a full second.

Jim had never seen the plume of a jet bottle in hard vacuum before. It surprised him, blowing in all directions like a fountain made of white fog. Some of it even came straight backward, striking his faceplate and bouncing away in straight lines. But it did the job; his rotation sped up a little, but his linear motion had reversed.

The floodlights were finally on, so even with his lamps pointing off to nowhere, he could clearly see he was just twenty meters from the station--still too close to take in the whole thing at a glance--and he was moving toward it. Almost exactly toward it.

He was going to hit with his back, though, so he pulled his knees in and rotated his arms, swiveling like a high diver or a dancer. Or an astronaut. This did nothing to kill his rotation, but it turned him around so the timing was right: he would hit the ladder arms-first.

"Bravo!" said the Pope, looking up at him.

Jim said nothing, waiting for the slow-motion collision that would bring him back in contact with the ladder. When it came, he grabbed on and, like Dave, got clipped to the wire again as quick as he could.

"So calm. We were never in danger at all," the pontiff marveled.

At which point Jim disappointed himself by answering, "Bite me, jerk. You just about screwed us both. Don't ever do it again."

To the Pope himself, yeah. Not the sparkliest moment in his lifetime, that. He clung there for half a minute, getting his breath back.

"Aaah, I can see you," Lisa said from the command cupola. "Looks like you're all right. Can you confirm?"

"Roger that," Jim puffed.

"You still have the other dosimeter to retrieve," she said apologetically.

Surprisingly, it was the Pope who answered that one: "I'm up for it if you are, Jim. It's gorgeous out here. Is that Madagascar? Who'd've thought it would need so many lights!"

4.

The Human Element

So far as the laws of mathematics refer to reality, they are not certain. And so far as they are certain, they do not refer to reality.

--Albert Einstein, 1947, "Geometry and Experience."

In theory, there's no difference between theory and practice. In practice there is.

--Yogi Berra, circa 1980

* * * * *

They had a big feast that night, with Chip and Robert doing most of the cooking and Jim doing most of the cleaning up. Dave and the Swiss Guard were still looking a bit green and didn't eat much, and at first the setting was quiet. Having the Pope over for dinner had made everyone shy, and the near-accident this afternoon had knocked a bit of the stuffing out of them, too. It could have happened to anyone, and it could have been bad.

But the silence ran deeper than that. For six months, Dewey Park Station had been home to five people--its very first tenants--and though they'd enjoyed good contact with the ground--by email, by phone, by video conference--they'd become a pretty tight little society up here. More so than Jim had realized; having any strangers at all here felt really weird, really cramped. Like hosting a dinner party in your car.

It must be strange for the new crew as well. They'd been training together for six months, but mostly during the daylight hours; afterward they'd gone home to their families. This was probably the first night they'd all spent in the same place. And it was an unfamiliar place, too; they would have spent time in the Franklin mockup at Offutt Base, but a lot of the systems there were fake, or modeled after the other two stations, which differed from Dewey Park, and from each other, in small but meaningful ways. And there was no gravity here; that made a big difference all by itself.

And then there was the privacy issue: Jim and company would be moving out of their cabins in the morning, except for Robert, who offered to cede his to Pope Dave tonight and sleep instead in the command cupola. Everyone else would be sleeping in bags out here in the wardroom, or on the shuttle, or (if they really really needed the quiet, and didn't mind the cold) in one of the airlocks. It was a camping trip with an unfamiliar crowd.

So here the new crew was, watching the old one go through their dinnertime paces with practiced ease. Dealing with spills, with errant food particles, with appliances and utensils and power management systems ... Jim could see it in their eyes: it was a lot to take in, and they weren't completely sure they could handle it. All this and danger too! They were happy to be here, yes, but a wee bit overwhelmed.

Still, that was life in the Service. Pope Dave broke the ice by saying a short grace in English, and Lisa followed with a story about her husband, a chainsaw, and a bolt of lightning that had flashed out of a mostly clear sky. It wasn't a funny story per se, but she laughed while she told it, and by the end her giggles had infected everyone but the Swiss Guard, who probably understood English but were good at pretending they didn't.

Then Robert launched into one of his Stormbreaker tales. "At twenty thousand feet you have *time* to respond when a microburst hits, but it'll take your breath away. Suddenly your air speed is a hundred kilometers faster, and aimed at the freaking ground. The good part is, you're falling along with the hailstones so your chance of a windshield strike is smaller. But there was lightning crashing around us as well, and in the darkness it was blinding. Just blinding.

"Anyway, wouldn't you know, our load of CloudKill powder just wouldn't deploy. I'm, like, pulling the handle over and over, because I'm ready to get out of there, but there's ice in the vents or something. So I'm screaming at Howard to kick on the heaters, kick on the heaters, but Howard's tossing his dinner all over the cockpit. It took me five whole minutes to break the center out of that anvil and climb away, and truthfully I'm not sure the plane ever flew again. I bet the wings'd fall right off."

"Cool," someone said.

Jim didn't have any stories like that. There were a few close calls in his air tanker days, but nothing that really made for a good anecdote. He had his own vivid memories of the storm in question, but he'd been working the ground side of the operation. Just as critical, but the drama of it was harder to convey.

He toyed with the idea of telling his Pope joke, but thought better of it, and settled instead for an account of the EVA slip, heavy on detail and light on emotion or judgment. People were curious about that, and the details were still fresh in his mind. Fortunately, no one seemed particularly to blame him, or Dave, for what had happened. Which was good, because Jim wasn't sure himself whether he'd been brave, stupid, lucky, unlucky, or just plain careless. Or maybe victimized by a sadistic miracle?

"You saved my life," the Pope had said, a few minutes after it happened.

"I *endangered* your life," Jim had corrected.

"No, I did that myself: went outside in a quantum storm without knowing what I was doing. You're not responsible for my choices."

Ah, but what about his own? Jim had long suspected he was a bad decision maker. Sure, he'd landed one of the coolest jobs on Earth, which in turn had gotten him *off* Earth, but the separation had apparently cost him his family. Not that he and Carla had been doing all that well beforehand. More bad choices, in the face of bad events dished out by the world. Could he have handled it differently when Rachel got sick? Were they all doomed from the outset?

Fortunately, Chip saved him from further thought on the matter by hauling out his guitar and playing a couple of songs, during which a pint of Scotch whiskey appeared as if by magic, and made the rounds, disappearing almost as quickly. Even the Pope had a snort, though his guards did not.

Then for a few minutes Dave was off in a corner, talking with the guards in low tones, and then one of them went down to the shuttle and never returned. Then finally, inevitably, the conversation turned toward matters religious. Had Dave ever been a cardinal? Had he known he was a candidate for Pope? Where was he when they first told him he'd been elected? These questions were duly answered: No, Heck no, and buying a pair of shoes at a store in Philadelphia.

More questions followed, involving God and Jesus and even more obscure issues, like sin. Jim had no interest in these things, and was suddenly feeling unaccountably low, so he floated off to his cabin and slid the fanfold door over until it latched. He would call his family, such as it was, and let them know he'd be home soon. Not to stay, alas, but to say hi and pick up his things.

Unfortunately, the call went poorly, and ended with shouting. In a more philosophical mood he might've mused on the intertwining of love and pain; the people who brought you real distress were the ones you built your life around. And they were the ones *you* hurt in turn. In a perfect world there'd be no force stronger than love. In a world where little girls needed brain surgery and two-income families went bankrupt, things were more complex.

"I love you, Rachel," he told his daughter, trying not to look too sad. Trying not to see her scars. Trying hard to believe her when she smiled in that funny new way of hers and said, "I love you, too, Daddo." But where exactly did love reside? Did losing half a brain have perhaps some small impact on a person's feelings and memories? The girl who'd recovered from that terrible surgery was not the one who'd lain down for it. *That* girl was dead, and Jim knew in his heart that by agreeing to the procedure, he'd helped kill her. Of his own free will?

"I need to talk to your father," Carla cut in at that point, her voice cold and angry.

"Hey, Sweets," Jim tried. "How's MalevoLink?"

"LeverLink!" she snapped, moving her angry face into the picture. "That's LVLK on the Nasdaq, Bub, up fifty points this morning alone. Anything else you want to trash while we're at it?" And things had gone downhill from there.

By the time Jim hung up his shoulders were cranked bowstring-tight; his fists were clenched and looking for something to punch. But even his bed, even his pillow, would shake the whole station. What he really needed was a long, cool walk beside the Platte River, or at least a quick run around a track somewhere. Here, the best he could manage was a jog on the treadmill with his body held down by rubber bands, and if he did that the noise would drown out most of the wardroom's conversation. Still, with the emotion boiling inside him he found his cabin too small, too confining. If he stayed in here, he *would* smash something.

Damn! How had he ever loved that woman? And why did he love her still, even now? She'd never understood his Rachel feelings, much less condoned them, and the money woes had stolen away the last of her charm, leaving nothing of the saucy 23-year-old he'd long ago fallen for. In all the ways that mattered, she seemed to be dead as well.

With a sigh of disgust, he unlatched his door and yanked it open only to find, for the second time that day, the face of Pope Dave waiting for him on the other side.

"Oh!" said Dave.

Jim sighed again. "Hi. Sorry. Did you hear any of that?"

Dave offered an apologetic look. "I think the whole station did. Is there ... anything I can help with?"

"No." Well, that sounded bad. Ungrateful, undiplomatic, unprofessional. "I mean, thanks for offering, but some situations are beyond repair."

"No pain is beyond repair, Jiminy."

Jim flashed him an angry look then, and said in a low voice, "Don't give me any of that Pope routine, all right? No offense, but you're brand new in the job."

"I've been a priest for thirty years," Dave answered without rancor, "and a bishop for four. I've seen a lot of things. Every situation is unique, but pain feels the same for everyone."

"Uh-huh."

Dave dropped the subject as easily as he'd taken it up. Instead, he fished in his pocket and then held out a silver coin or medallion of some sort, in a clear plastic case. "I stopped by to give you this, as a token of my thanks."

"For putting you in harm's way? And yelling obscenely?"

"For taking me outside. You had your doubts, and rightly so, but you did it anyway, at some risk to yourself. Also for talking with me, for letting me observe your scanning session. You've given me a lot to think about, and whether you take that seriously or not, it'll affect the lives of a billion people."

Jim looked down at the medallion. One side bore a chalice and some Latin writing, the other a picture of David Wayne Stassi himself, with the words "DAVE I" and a date underneath.

"Keepsakes like this are one of the perks of the office. I worry about the vanity of it, but as an encouragement to good works they do seem useful. They've also been specially blessed."

"By you?"

"That's right. Believe what you like about it; this is something tangible I can give you."

Jim hefted the thing. It was heavy: a full troy ounce of silver, or maybe forty grams. The embossing was nice as well; where the coin didn't shine like a mirror, it had a frosty, marbled, rainbowy kind of look to it--some kind of subtle hologram thing. Computer-generated microtexture? The portrait didn't move or change in any overt way, but there was an animated quality to it nevertheless. Mint condition, probably never removed from its package.

"Um, thank you," Jim said, brought up a bit short by this. The thing was probably worth a thousand bucks, and worth even more as--yes--a memento of this strange encounter. "Always happy to do my part."

The Pope paused for several seconds before asking, tentatively, "May I offer you some advice?"

"Sure," Jim said. Why not? The cardinals had presumably picked this guy for some reason; he certainly wasn't stupid.

Dave put his hands together and said, "Trust."

Hmm. Was that it? "Trust what?"

"Yourself. Your wife. Your feelings. The laws of nature."

"Trust in God?" Jim asked, oozing skepticism.

But the Pope's answer was mild. "Absolutely. To you, God is just an idea. A symbol that stands for a lot of complex things. My advice is, trust him anyway, because the things he stands for are worthy. Clear your mind, Jim. Try praying. The very worst that could happen is, it won't work. Then again it might surprise you with answers and insights, mysterious bouts of good fortune ... We may not grasp its full implications yet, but there's a quantum-mechanical basis for believing."

At that, Jim couldn't quite help rolling his eyes. "Believing came first. You're just here to confirm what you think you know."

"Like the atom," Dave agreed. "Absolutely. And here's a little something for *you* to think about: the President sent Stormbreakers up here. Not chasers, not trackers, not patient data collectors."

"We are collecting data," Jim said. "Patiently."

"Oh, I know," the Pope agreed. "No offense intended. But your very presence here has an inhibitory effect. How many hypercones will never reach the ground, because your own thoughts keep them from forming? You guys are the barrier island on which God's storms can break."

Oh, so it was like that? Angrily Jim said, "You're here to shut us down? We're blocking your heavenly reception? Shit. You can take back your stupid medal, Dave."

He handed the thing over, but the Pope just looked at it, refusing to reach out. "Jim, I'm not your enemy. Really. The stuff you guys are uncovering here could change the world. Think of all the wars, all the genocide we see in the name of religion. What if we *knew*? What if we could map the will of God? Whether you choose to believe it or not, you and I have the same goal: the truth."

"Yeah?" said Jim. "Really? What if the truth doesn't match Christian doctrine? If all the little holes don't line up perfectly, you're not just a radical Pope. You're a *heretical* one, and they'll nail you to a cross for your trouble."

Dave just smiled. "Me? I'm a puppet show guy from PBS." Then he did an odd thing, pressing the heel of his hand against the middle of Jim's forehead, not quite hard enough to push him back into the cabin. "Blessings of the Lord be upon you. Sleep soundly tonight."

And it was probably just hypnosis or something, but Jim felt a slight buzzing sensation and remembered nothing more after that until he awoke, snug in his bag-bed at 06:30 the following morning, with a dream of fragrant roses leaching away through the corners of his mind.

5.

A Fire in Heaven

The proper season is when the weather is very dry; the special days are those when the Moon is in the constellations of the Sieve, the Wall, the Wing or the Cross-bar; for these four are all days of rising wind. A wind that rises in the daytime lasts long, but a night breeze soon falls.

--Sun Tzu, circa 300 B.C., "Five Ways of Attacking with Fire."

* * * *

Mission Control was unaccountably understaffed; three of nine people had failed to show up for work,

and their backups took forty minutes to plug in and come up to speed on the mission details.

"Is there a plague?" Robert wanted to know, grumping into his headset microphone.

"Just a gorgeous July morning," the capcom officer on the ground had answered. He sounded like a kid, and nobody on the station seemed to know who he was in more than a recognize-the-name kind of way.

Anyway, this put departure ops nearly an hour behind schedule, which necessitated all sorts of rushing around. There wasn't much time for sappy handover sentiment, or for proper procedural training. In six months the station crew had settled into a very efficient routine, which they'd had little chance to run through with the new crew. Galley power off *before* you switch the water heaters on, etc., etc. But if they missed their landing window it would be another full day before they could get out of here, and nobody seemed willing to consider it.

"Take care of her," was pretty much Robert's sole instruction to the new commander.

Jim, for his part, told Kennet to call his cell phone if she needed anything. The phone didn't work up here, of course, but once he was on the ground--or even near it--he'd be back in that part of the world again. The Noosphere, Tielhard had called it. The buzzing atmosphere of information that surrounded the planet, thicker and thicker every year.

Amusingly, Pope Dave had a heavy-looking satellite phone that *did* work up here. He spent several hours yakking into it in Italian while the crew rushed and fussed around him. "I'm told this thing would work on the Moon," he remarked to Jim at one point, covering the mouthpiece with his hand. "It's secure, too; heavy encryption. Pretty cool."

Hmm. Perks of the job. "The chicks must love you," Jim answered, then caught himself. He'd just zinged the Pope. A regular-guy kind of Pope, to be sure. Easy to talk to, all that. But a billion people did look to him as their spiritual leader. Would Jim talk to the President that way? To a movie star? Probably, yeah, but he ought to watch it just the same. The Swiss Guard didn't like him already, and made no particular secret about it.

Finally it was time to seal the hatch, to isolate the atmospheres, electrical systems and computer networks of the shuttle and station. Jim and Chip walked through the steps together, each making sure the other hadn't left anything out.

"Some Russians died that way," Chip noted. "Left a valve open and suffocated."

"Pretty crappy valve design," was Jim's answer to that. General Spaceplane did a much better job of idiot-proofing. Still, since idiocy was one of the universe's truly limitless resources, he trusted nothing and triple-checked everything.

"*No, no, vi ho detto*," the Pope was telling his guards when Jim and Chip worked their way back to the mid-deck airlock. "I'm not riding in that thing. I want to *see*."

"See what?" Chip asked.

"Reentry." Dave jerked a thumb at the pair of jacks behind him. "These guys expect me to sit in the escape pod the whole time. There isn't even a monitor screen. I spent the whole launch sequence in there, and never saw a thing until we were already in orbit."

Hmm. Jim had seen that escape pod--was in fact about to check its circuit breakers and air vents--and he wouldn't want to ride in it, either. It was a two-seater only slightly bigger than a Mercury capsule, or a really compact sports car. Still...

"Reentry's the most dangerous part of our flight profile, Dave, and this is clearly the safest spot on the ship. It would look pretty bad for the Service if anything happened."

The Pope considered that unhappily. Here was his one and probably only trip into space, and he couldn't look out the window? "I'm here as your guest," he allowed. "Naturally I'll follow whatever course you recommend."

Hmm. Yeah. "We can tie the door open with a bungee cord," Jim suggested. "From here if you ... if you lean forward and crane your neck you should be able to see the mid-deck monitors. That's all *we* have to look at, me and Tomo and Chip. This isn't a tourist ship. Your guards can ride up in the cockpit, where the actual windows are."

"*Nein*," said one of the jacks in a thick European accent. "One in the cockpit. One in the pod with His Holiness. I insist on it."

That was no skin off Jim's nose either way, so he ran the arrangement by Robert and Lisa, who approved it without complaint. So, five minutes later when the systems were duly isolated and crosschecked, he strapped himself into the seat immediately forward of the pod, with Chip on his right and Tomohiro on his left. "Ready?" he called back to Dave and the guard.

"Whenever you are," the Pope confirmed. Boy, he did look cramped back there.

"Mid-deck ready," he said into his headset, pressing the push-to-talk.

"Aaah, roger that," answered Lisa, then rattled off a string of numbers for the benefit of Robert or Mission Control or somebody.

And then, with surprisingly little fanfare, they detached from the station, drifted away for a minute and a half, then fired a series of bursts on the attitude control motors, to turn the shuttle ass-backward in its orbit. They were behind schedule, so a whole series of checks and rechecks were skipped, while the pilots went straight into the deorbit routine.

"Point-three gee burn, eleven minutes nine seconds duration," Lisa said, presumably reading the figures off one of her displays up there. "Ignition in three minutes forty-one seconds."

"These are going to be a long three minutes," Dave noted, not over the headset but just calling forward.

But they weren't, really. Much longer was the deorbit burn itself, with the unfamiliar tug of gravity--or acceleration, anyway--on their bodies, on their chests and faces. They were all on the best gravity drugs and had kept to the exercise regimen so their bones and muscles didn't wither. Even so, after six long months of zero-gee, the pull of anything on your body felt more than a wee bit suffocating. Jim felt it most in his throat--a squeezing sensation, a feeling that his windpipe was no longer round, but some sort of oval. At point-three gee! They'd be pulling five times that much in a few minutes, when the shuttle turned around to face, nose first, a wall of gluey atmosphere at bone-searing temperature and speed.

The burn wasn't loud--just a hum and roar, like the sound inside a moving car--but nobody much tried to talk over it. When it was finally over, though, Jim turned and looked back into the pod.

"You okay back there?"

"Perfectly, thanks."

And as it happened, these were the last clear words ever spoken aboard that ship.

Death comes upon us in strange ways, shockingly sudden and disarmingly weird. Even months in a sickbed can't really prepare us for what's to come; the event arrives on its own time and terms, and everyone is caught off guard. Living one moment, struggling the next, and finally just gone.

There was no contrail. There was no explosion. Initially at least, there was no debris. Whatever you might have heard, it wasn't a missile. But there was a sudden streak of ionized air molecules, here in the wispy tendrils of the upper, upper atmosphere. As near as Space Command was able to figure it, the shuttle *Oberon* was struck by an anti-satellite energy weapon--most likely a hydrogen-fluoride laser based somewhere in central Asia. The Free Will Index was very high in that region; the choice to fire was made deliberately.

Shall we imagine human malice reaching out through a window of favorable weather? Shall we speculate on an agenda furthered, a To Do box checked off, a connection to the disappearances of NWS staffers in Omaha? Perhaps God or some other force could have intervened, or (troublingly) perhaps it *did*, in planting the seeds of these events. But the telemetry is clear enough: the beam passed completely through the fuselage in a tenth of a microsecond, unimpeded, leaving two fist-sized holes.

Jim's own perception was more muddled; one moment everything was fine, and in the next there came an orange flash and a loud noise, like the popping of air-filled bags. Bang! Bang! And there was a fierce wind, and sharp bits of something flying all over the place, and everyone was screaming.

The strangest property of accidents is the way we perceive them: not as movies, but as comic books. "It happened so fast. It happened so slow." People say both of these things, and mean them, because the event breaks up into a series of discrete, vivid snapshots.

Flash: Jim was somehow out of his seat, and looking aft at the escape pod, and the Swiss Guard was there with a panicky look on his face, trying to pull the hatch closed and punch the fuck out of there. But the hatch was bungee open.

Flash: Something lurched, hard, and suddenly Jim was back there on the pod, falling against the door in some kind of weak gravity. He was trying to draw a breath from the roaring air; he was hot and cold and hotter still.

Flash: the guard, in his space-jack flightsuit, was rolling up out of his chair and grabbing at the bungee cord, realizing the hatch wouldn't close until he somehow untied the thing.

"You're panicking," Jim wanted to tell him. "Just slow down and watch what you're doing."

But the words wouldn't come, and the part of Jim's brain that composed them was at the back of his skull, somehow--a passenger watching quietly while Jim himself panicked and thrashed. He wanted to help with the bungee cord, but that desire didn't seem to connect in any way with the actions of his body.

Flash: Finally, somehow, the bungee cord was floating free, and the Swiss Guard was bouncing away on a trail of jiggly blood spheres, and a hand was reaching out and hauling Jim into the pod. But whatever was happening here, Jim hadn't wrapped his head around it yet. He resisted, then actively fought. *Get off me, let go*, a part of him thought.

And then there was fire, and the ship was breaking up around him, and that clear, quiet part of his mind was noting, with absolute calm: *Could use a damned miracle right about now*.

Said a voice from the ground, "Track loss, track loss. The radar filter has multiple targets. Oh my God. Does anyone have lock?"

But no one did.

"Seal the mission control doors," said the flight director. "Call security. Get me a next-of-kin list. *Nobody* talk to the press."

But everyone did.

A sad story? A martyrdom in the grand tradition? This is what happens, sometimes, to those who can't leave well enough alone. As it turned out, though, the escape pod fell away with two bodies sealed and rattling loose inside. Parachutes? Barely. No radar saw it come down. But the conspiracy theorists will tell you: the Pope and the Weatherman survived their fall and are still out there somewhere, arguing about God and Heisenberg while they make their slow way home. And truth be told, in a world of provable miracles, stranger things have been known to happen.

But really, who's to know? Where such miracles hide in the shadows of quantum mechanics, they must work--by definition--in subtle and mysterious ways. And that's a good thing, right?

6.

Strange Waters

In our notebooks we were instructed to write the names of our top five choices, but when I finished, I saw to my amazement I had written "David Wayne Stassi" five times. Mind you, this was a man I'd barely heard of. "Smetta di scherzare," said Carlo Dallabetta, who sat to my right. Quit clowning around. But I noticed he had done the same thing, as had Michal Wonarowicz to my left. It looked peculiar, I'm the first to agree, but three polygraphs later, the College began to realize this was no ruse, but a message.

--Cardinal Albert Ryan, 2012, "That Election"