Dell Magazines
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CONTENTS

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Vol. CXXIX, No. 4, April 2009
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Published since 1930

First issue of *Astounding* January 1930 (c)

Reader's Department: **EDITORIAL: RESEARCH I** by Stanley Schmidt

The lead article in a mid-September issue of the weekly science section in *The New York Times* brought back some fond memories and reminded me of a general principle of scientific research that's too easily forgotten—and a common human trait that can get in the way of that principle's full application.

The article ("Weather History," by Anthony DePalma, September 16, 2008) described a remarkable bit of scientific research that's been going on for more than a century at Mohonk Mountain House, the last surviving example of the nineteenth-century "Catskill resorts" (though it's really in the Shawangunks, a less widely known range south of the Catskills). That may seem an odd setting for scientific research, and in fact the hotel is not turning out revolutionary theories. What it is doing is the no less important task of collecting—on a scale and with a consistency seldom matched elsewhere—the raw data that theories seek to explain and use for predictions.

Since the beginning of 1896, the hotel has maintained a weather station at which, every day, without fail, a trusted someone has recorded such variables as air temperature, pressure, precipitation, and water temperature and pH. The job has always been considered an important and respected one, and in 112 years, only five people have done it, always in the same way and at a station that has never been moved.

That makes the results especially meaningful and valuable. If you're constantly changing from one location or method to another, the results become tricky and suspect. Are you really seeing a climatic trend, or just the result of using a thermometer now that consistently reads higher than the one somebody else used last year? With the extreme consistency of personnel, methods, location, and instrumentation at Mohonk, most of those variables are removed. If their data show what looks like a climatic trend, it probably *is* a climatic trend.

And that, as we all know, is a subject very much on many people's minds these days.

Moreover, we're not just interested in how temperatures and precipitation are changing for their own sake, but for what effect, if any, they have on other variables such as ecosystems and growing seasons. Mohonk is making large contributions there, too, because their handful of dedicated weather-watchers have also kept painstaking phenological records—such things as when the first frost occurs in fall, or the mountain laurel begins blooming, or the first orioles arrive in spring. So by poring over the data the Mohonk people have already gathered, other researchers can identify patterns in weather, biological phenomena, and how the two are related. Some of them, like meteorologist Raymond G. O'Keefe and climatologists Benjamin I. and Edward R. Cook, are doing just that.

At present, the man in charge of the observations at Mohonk is Paul C. Huth, who has been there for 34 years. The weather station has grown into the Daniel Smiley Research Center, named for Daniel Smiley Jr., a descendant of the Quaker brothers who started Mohonk and a self-taught naturalist who did this work himself for more than fifty years, until he died in 1989.

I met Dan Smiley in 1986, one of three winters in the mid-'80s when I helped Isaac Asimov run science fiction weekends at Mohonk. As you might expect, those weekends were a lot of fun and intellectually stimulating, with a variety of both formal programming and informal conversation with participants (and lots of convivial meals with Isaac and Janet). But there was also free time to explore the extensive and ruggedly scenic grounds surrounding the hotel, either independently or on organized tours. Joyce and I went on one hike enthusiastically led by the 79-year-old but still very vigorous Dan Smiley, who spent much of his time describing both tiny details and large-scale trends gleaned from his decades of observations of what went on there.

Those observations were not made with the idea of collecting data to bolster a theory or prove or disprove a point. They were, quite simply and deliberately, *observations*, as accurate and complete as he could make them, but not trying to be—indeed, specifically trying not to be—anything more or less. Dan's idea was to accumulate, over the long haul, a comprehensive record of what *was* happening, without regard for anybody's preconceived notions of what *should* be happening. If he heard a spring peeper or saw a rhododendron flower just opened, he recorded it, with careful notation of such variables as when and where, even if the when and where were not what he would have expected.

Since he started this in the early twentieth century, he didn't do it the way you or I probably would now. He kept his records on index cards—some 14,500 of them, by the time he died. If he got a hunch that he was starting to see a pattern, like newts laying their eggs earlier and water pH falling in certain ponds, he could pull up all the cards referring to newts and/or pH and start comparing and graphing their data, looking for patterns and connections.

The trouble with that system, from the viewpoint of somebody accustomed to our present methods, is the difficulty of finding the relevant records when you're looking for them—and deciding how to store them in the first place to make that as easy as possible. After all, you may not know, when you make your original observations, which data will seem important in 20 or 30 years. As it happens, Dan did record anomalously low pH levels back in the 1930s, long before anyone had the concept of acid rain. Those records were later valuable in studying that problem, but when he wrote them down they were just numbers whose significance, if any, was completely unknown.

So if you're in the field and you stop by a pond and record the pH and the absence, presence, and number of newt eggs on index cards, how do you file them? Do you put newt numbers on one card and acidity on another? Do you put both numbers on one card, so you can immediately see correlations if you look at a stack of such cards? If so, do you file them under “newt” or “pH"? Or do you make duplicate cards so you can file them in both places, much as librarians used to make title, author, and subject cards for each book in their collections?

My example is artificially simple. In the real world, an observer might record half a dozen or more variables at each checkpoint. Even if she makes a separate file card for alphabetization under every variable she thinks might later be important, it may turn out that what's really important 20 years later is an item she thought was just an incidental curiosity and so didn't treat as a key word for indexing. How will she find all the cards that mention that?

It won't be easy—but it would if, instead of using index cards, she had recorded everything in a relational database or a hypermedia file. There, for example, it's easy to simply dump all of a day's observations into one entry, with no thought at all about which ones to consider “key words” or how to alphabetize anything. As long as it's all in there, the computer program can look for whatever combination of search items you want, and sort them according to your present needs and wishes—and far more quickly than a person could search for even primary key words on well-sorted index cards.

By the mid-'80s, such applications were readily available. They were nowhere near as powerful as the ones we have now (which are nowhere near as powerful as the ones we'll have in ten years), but quite adequate to greatly facilitate the kind of work that Dan Smiley was already doing with index cards. So I asked him whether he'd ever considered switching to them.

He didn't have to think about it. He did know about the possibility, but had no interest at all in switching over. Initially I found that a little surprising. Having worked with such things myself, and been impressed by how much I could do with them, I felt sure that if he tried the new tools, he'd love them. But, I told myself, it was hardly surprising that somebody who was already 79 wouldn't want to switch to such a radically new way of doing things. After all, we've been conditioned to take it as almost an article of faith

that as people get older, they routinely become set in their ways and reluctant to try new ones....

But it didn't seem to me that Dan Smiley was that kind of guy. Even at 79, he seemed very sharp and adventurous, and quite actively interested in learning new things. It later occurred to me that he may well have had a better reason for not wanting to make the switch, one that I could easily empathize with (though it occurred to me too much later to confirm my guess by asking him). It's the old bugaboo that I've occasionally called the “continuity problem": the difficulty of preserving old information in a form that can easily be utilized with new tools.

The value of Dan's treasure trove of data was that it spanned decades, in great detail. Having it stored in some form of searchable database would have made it far easier to mine and manipulate—but for his old observations to be incorporated into that new and improved resource, the contents of all those old index cards would have had to be manually converted to a new electronic format. I know from experience that that's a huge job, and Dan may well have thought that wouldn't be the best use of what were likely his few remaining years. And if he had left the old data on cards and just started storing new ones electronically, he would have had two separate sets of data, not easy to compare directly—and the newer ones, though stored in a nifty form, would have been too young and small to be very useful. So, I surmise, he preferred to keep it all in the form that most of it already used.

In any case, the real value of what he did lay in the content he collected, not in the tools he used to do it—and that value is large and often undervalued. The Nobels go to the folks who figure out elegant theoretical models to explain observations—but the first stage in any kind of research will always be to collect enough data to begin looking for meaningful patterns. Galileo, Kepler, and Newton couldn't have done what they did without Tycho Brahe's painstaking observations of what *happened* in the heavens. My brother Dennis, a physicist and programmer with a strong interest in psychology, long ago remarked that what psychology needed was its own Newton—but later he said, “I was wrong. Psychology isn't ready for a Newton. First it needs a Tycho Brahe."

So it will be with any field of scientific endeavor. The glamour may go to the grand theorists, but let's never forget the respect we owe the guys and gals who toil in the scientific trenches—the Tycho Brahes, Dan Smileys, and all the others who collect the vast amounts of raw data that we must have before we can begin to make sense of it all.

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Analog Science Fiction and Fact (Astounding), Vol. CXXIX, No. 4, April 2009. ISSN 1059-2113, USPS 488-910, GST#123054108. Published monthly except for combined January/February and July/August double issues by Dell Magazines, a division of Crosstown Publications. One-year subscription $55.90 in the United States and possessions, in all other countries $65.90 (GST included in Canada), payable in advance in U.S. funds. First copy of new subscription will be mailed within eight weeks of receipt of order. When reporting change of address allow 6 to 8 weeks and give new address as well as the old address as it appears on the last label. Periodical postage paid at Norwalk, CT and additional mailing offices. Canadian postage paid at Montreal, Quebec, Canada Post International Publications Mail, Product Sales Agreement No. 40012460.

[Back to Table of Contents]

Novella: **GUNFIGHT ON FARSIDE** by Adam-Troy Castro

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Illustration by Vincent Di Fate

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When is sacrifice not a sacrifice?

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The first thing you learn about the famous Gunfight at the O.K. Corral is that it was not fought at the O.K. Corral.

No. I'm sorry. That's not quite accurate. I mean, it's quite true that the gunfight was only near the O.K. Corral, and not actually in it. That's a simple fact of history.

But that's not the first thing you learn.

The first thing you learn about the Gunfight at the O.K. Corral is the canonized bullshit with no bearing on what actually happened.

You learn about it from old movies, or holos, or, in my case, that big-budget stage musical that played the Shepardville Dome for years: the silly one where Doc Holliday was a woman, the Clantons spoke in blank verse, and the badges worn by the Earps, just below what would have been their belts, were the only item of clothing that stood between them and full frontal nudity. (Someday, if I ever feel conversational again, you can probably start me off on a two-hour rant by asking me to hold forth on past trends in popular entertainment.)

The story may fade into obscurity for up to thirty or forty years at a time, but something about it keeps exerting a powerful tug, and it keeps coming back, each time twisted out of all recognition for the prejudices of a new generation. I even remember one popular holo, from a season more cynical than most, where the Clantons were peace-loving, unarmed settlers, who wanted only to be left alone, and the Earps were evil corporate types who slaughtered them just to show that they could. I took a perverse pleasure in scrambling that one before I tossed it into the recycle bin.

Peel away all the layers of absolute invention and you find that the gunfight between the Earps and Clantons took place in Tombstone, Arizona, on 26 October, 1881. It was a down and dirty shootout, nominally an act of law enforcement, but one so mired in past grudges that it's just as easily explained as a street fight between two gangs that hated each other on general principle. If it hadn't happened that day it would have happened the next day, or the day after that. Little fancy marksmanship was involved, as the two groups started blasting away at each other when they were standing face-to-face, with thirty rounds of ammunition fired in about as many seconds. Far from dashing, heroic, and romantic, it was up-close, ugly, and downright sordid, much more a street execution than a battle between the forces of law and lawlessness.

If Wyatt Earp is still remembered as a hero today, a century into the era of space colonization, it's at least partially because he survived these events for decades, and therefore got to hang around Hollywood telling his story to the people who made their living deciding what bits and pieces of historical ephemera could be inflated to legend with the help of clever angles and matinee-idol faces.

Since then, the story has been twisted every which way by anybody who wanted to appropriate it for his or her own purposes. The historical facts are available, and far more interesting than anything the holos or movies or even nudie musicals have come up with. But their very malleability is what makes the story

immortal. Someday, when mankind cracks the interstellar travel problem—and one of the lesser points of this story is that I know for a fact we will—there'll be versions with the Earps in spacesuits and the Clanton/McLaury gang as any alien race we don't happen to like that week. By then, it may no longer be recognizable as an event based on historical fact. Earp himself may be considered no more than myth, like whatever inspired the similar myths of King Arthur and Robin Hood. Hell, he's halfway there already.

But he's not alone on that journey.

* * * *

By the time I entered Malcolm Bell's story, the Moon had become a crowded world, crammed pole to pole with resorts, cities, factories, and the folly of mankind. But not all of it was crowded equally. All the places where tourists wanted to go were on Nearside, with all the lovely views of the battered blue marble, still shiny and bright despite the scars well visible from the observation domes at Armstrong. Even those of us who'd grown up on Luna and had never set foot on the homeworld still suffering the woes of the last centuries preferred to see the ancestral cradle in our sky.

We weren't always that philosophical about it, of course. Most of the time, we just liked it there because it was pretty. (There's a reason lunar residents sometimes called it The Chandelier.) But whatever our reasons, its presence made Nearside prime real estate. Everybody you could deal with wanted to live on Nearside.

Farside was a different story.

On Farside, facing nothing but distant stars and a sun that seemed less than the source of all light than a cruel beacon existing to bring the forbidding landscape into sharp relief, it was easy to feel cut off from all of human history. It therefore became the home of choice for the kind of people who saw that as a selling point. At the time I visited, it was a collection of industries too dangerous to be set down anywhere people lived, and a few scattered homesteads belonging to all the weirdos, misfits, misanthropes, and creeps who preferred solitude to people. It was crazy country, then and now, and the main reason it's been allowed to stay that way is the general consensus that anybody twisted enough to actually want to live out there was better off living in their self-imposed quarantine anyway.

Of course, humanity being the animal it is, the rest of us sometimes have trouble leaving them the hell alone.

On the day I'm talking about, I arranged for the skimmer to drop me off with less than two hour's worth of oxygen and not come back for me for at least five.

Bell's habitat, only a short walk away, was an unlovely oblong metal box, much like the one I live in as an old woman. It was marked only by the usual ten-digit registration number and a series of dents it had collected in its earlier, stupider home at the base of a ridge much given to spontaneous rockslides. The recycling systems and supply dumps in the back took up much more space than his living area could have. The absence of any parked vehicle confirmed what I'd heard about him, which is that it had been a good thirteen years since he'd last bothered to visit the nearest center of population. That was about typical for some of the folks living on Farside. At the time, it made no sense to me, which should tell you a lot about how long ago this was.

I was halfway to his airlock, my ridged boots causing miniature avalanches as I slid down the gentle grade, when an automated signal with absolutely no trace of static came in over my helmet speakers: “...trespassing. Repeat, this is private property and you are trespassing. Failure to retreat will result in the activation of security measures, which may result in injury or death. The owner values his privacy and will not suffer a single night's missed sleep blaming himself for your probably genetic stupidity. Please turn

back. Message repeats: this is private property and you are trespassing. Repeat, this is private property and you are trespassing. Failure to retreat will..."

I toggled the transmit button. “This is a distress signal. Stranded surveyor, running out of oxygen. Cannot hold out while awaiting relief. Need shelter immediately. Over."

The signal loop cut off in mid-sentence, replaced by a gravelly voice with a distinct Texas twang. “Now that's just bullcrap, young lady. I watched that skimmer drop you off. You came here deliberately and you're hoping to blackmail me into opening my door for you. Isn't that true? Over."

I'm afraid I grinned. “It's true, sir. I did come here deliberately, because I'm hoping to speak to you, but my distress is very real. I am running out of oxygen and I am in imminent danger of death and I do need you to save me. Over."

"Why would you put yourself in such a brain-dead situation? Over."

"It's actually a pretty smart situation, Mr. Bell. Just about everybody I've spoken to about you, and everything I've read about you, says there's no real possibility of you allowing me to die. But they also say I need the threat in order for you to let me in. It's the only way I could think of to speak to you."

The anger communicated by the next five seconds of absolute silence was an object lesson in the potential information content of dead air. There was none, however, in his voice. “I've now recorded your admission that you placed yourself in this position for the express purpose of invading my privacy. Under the circumstances, the crimes you've committed just coming here trump all of Farside's Good Samaritan laws. If I did let you die, no court would convict me."

"Maybe not,” I said, “but I'm still pretty confident it won't come to that."

He cut the connection. A second later, the warning loop returned, reminding me once again that I was headed directly toward a violent and messy death.

I had nothing to lose by continuing to walk forward, the pebbles and dust dislodged by my boots forming a silent cataract that preceded me into the pockmarked valley below. I had chosen lunar daylight over lunar night as the best time to make this approach, mostly because it had struck me as less threatening ... but now I wondered if this had been a bad idea. The landscape, which had now had a good week and a half to bake, was radiating the heat of the unfiltered Sun back at me ... and though my suit could take this and worse, there's a major difference between being protected from a hostile environment and not being able to feel the sweat pooling at the base of my spine.

I reached the bottom of the slope, faced the habitat a mere fifty paces away, and sucked a water tube for a minute or so, as I contemplated the best approach. I wasn't sure I believed him about the booby traps, but where would I put them, were I an antisocial old coot with a mania for privacy? He wouldn't put them too near his own walls, lest the shrapnel leave him spilling atmosphere faster than he could lay a patch. Nor would he put them anywhere near his airlock door. He might be just crabby enough to lie in his bunk all day, but he needed the main egress intact so he could get to the supply drops set down no further than twenty meters away, five times a month. Nor would he set his triggers too far from home, out here at the edge of his bowl where the standard warning was still playing in infinite loop. He'd need to be able to justify such extreme measures, if it came to that—and the best way to do that was to give potential trespassers every possible chance to heed his warnings.

No need in tempting fate. I'd be better off sitting still and relying on his sense of humanity. So I sat, turned the cooling unit to the lowest power I could tolerate, and waited, thinking (among other things) of Wyatt Earp.

* * * *

Four days before I had that skimmer drop me off in front of that tin-can habitat on Farside, I watched half-a-dozen action holos set in the early days of lunar settlement. They made that pioneering time, when the Moon's entire population was comprised of Ph.D.s and engineers, look like the province of murderers and sociopaths, pursuing blood feuds and exchanging gunfire in the tiny little outposts those early pioneers had dug into the lunar rock. It was, we're told, a time of outlaws, a time of heroes, a time when only the quick reflexes of a few brave men maintained the fragile order that allowed Luna to become a fit home for millions.

Like most of the stories told about Wyatt Earp, it's total bullshit.

The truth is that those early engineers were all subjected to exhaustive psych testing before they left the Big Blue. There weren't any outlaws or crazies among them. If they presented any danger at all to the colleagues who worked alongside them, it was in the very real likelihood that they'd bore each other to death with conversations that had already been recycled past all reasonable usefulness.

There was, in fact, only one actual gunfight in the entire first thirty years of lunar settlement.

Only one.

* * * *

"What's your name?"

The signal amplified by my helmet speakers was punctuated by crackles and hiss, a noise ratio not quite bad enough to obscure the old man's words, but enough to establish that he used antiquated equipment and couldn't be bothered with tuning his signal enough to ensure clear transmission. I couldn't help thinking of my great-grandfather, who had always removed his teeth before dealing with anybody outside the family. If anybody had trouble understanding him, that was their problem. As long as they wanted to waste his time, he saw every advantage of making them work for it.

I said, “Jessie James."

The pause that followed was entirely familiar to me. I heard something like it just about every time I gave a stranger my name, and its Wild West resonances had to hit him harder than just about anybody I'd ever met. “You're kidding me."

I shrugged, an absolutely pointless gesture given that it disturbed the broad outlines of my moonsuit not at all. “My parents were history nerds."

"Were?"

"Sorry. Are.” They were both members of the Lunar History Department at the State University at Grissom, as well as American history buffs by inclination.

"So they're both alive, then."

"Yes."

"Did they neglect you?"

That surprised me. “No."

"Abuse you?"

"No."

"Emotionally abuse you?"

"No."

"They're good parents, then?"

"Yes."

"They love you."

I didn't understand this line of questioning at all. “Yes."

"Do you have a lover, Jessie? Maybe a husband or wife?"

"Nobody that serious.” Though there might have been, before a certain obsession had started taking up too many of my waking hours.

"But people who care about you."

"Yes."

"And yet,” he said, his voice rising just enough to establish frustration, “you care so little for them that you're willing to risk breaking both their hearts by throwing your life away on a pointless mission to harass an old man who hasn't given an interview in decades or even left his home in thirteen years. Forget the way I want to live my life. Think about what your parents want out of theirs. Did they get out of bed this morning wanting to hear that their crazy daughter's been found, spam in a spacesuit, just ten meters from an old recluse's home on Farside?"

Damn, he was good. There was no way I could hear that question without feeling a twinge. But I had spoken or corresponded with all five of the people still alive who had begun their own lives as Bell's children: the two sons living and working on Luna, the pair of daughters working contract work out on the Belt, even the eccentric writer best known for his weekly rides up the Central African Space Elevator, to regale the world with renewed confirmation that the horizon still curved. All five had described themselves as baffled by their long exile from the old man's life. All five had testified that, the last times they'd spoken to him, he'd still cared about his legacy and place in history. So I countered, “Did your children get out of bed this morning wanting to hear that their heroic old man will always be remembered as the unconscionable son of a bitch who let me die?"

It's funny. Sometimes you can hear more in a man's silence than in his angriest words. I heard him stew, heard him thinking of the way the news would spread throughout the system, heard him remembering what it was like to have a legacy, and heard him contemplating the human costs of shitting on it.

He was silent for so long that I felt mortal for the first time today, wondering if I might have guessed wrong. There were, after all, any number of things that could happen to a man's mind and soul in thirty years of self-imposed solitary confinement. Forget how embittered he must have been just to lock himself away. How insane would he have become in the decades since?

Then the crackle returned. “I don't appreciate emotional blackmail."

"Neither do I, sir. That's not what this is."

"You don't know what you're messing with, here."

"Then tell me."

Another pause, too lengthy for comfort.

Then a burst of grudging profanity, and: “Walk where I tell you and only where I tell you."

I stood up, wincing as my knees creaked. “So there are mines."

He barked a derisive laugh. “Explosives are weapons for people incapable of arranging precision, who see advantage in laying waste to everything within a given radius. My explosives are nowhere near that wasteful. If you take any wrong step in the next ten meters you'll find yourself wearing a suit with a clean circular leak about the size of a quarter. If it's within reach, you might be able to cover it with one hand and survive long enough to walk the rest of the way ... but that's only if you see it in time, and correcting for further missteps would become difficult indeed once both hands were occupied. If that happened, I would not have time to suit up and rescue you, and I move too slowly these days to arrive in a hurry. So back up a few steps and follow my instructions. Right now, you're surrounded by pressure plates on three sides...."

* * * *

In one of the most popular but least accurate Hollywood versions of the Wyatt Earp story, John Ford's *My Darling Clementine*, Tombstone stands against the distinctive formations of Monument Valley.

This must have come as a complete puzzlement to moviegoers who happened to live in the real-life town.

Moreover, the film ends with Earp's friend Doc Holliday dying from wounds suffered during the gunfight ... a development that must come as an equal surprise to those who know that Holliday died years afterward, not peacefully but certainly not from violence, in the hospital where he'd retreated to cough away what remained of his tubercular lungs.

Like many versions of the tale, *My Darling Clementine* had less to do with what actually happened than with the story the people in question wanted to tell.

The same goes with *Airless Fury*, the most famous fictional treatment of the famous First Gunfight On The Moon. It's famous now as one of the first non-documentary holos ever filmed by a Moon-based production company. Malcolm Bell, who was at that point naive enough to sign away the rights to his story without any assurances regarding accuracy of content, always credited it (or, more accurately, blamed it) for his unwanted status as legend. Frankly, it makes *My Darling Clementine* look like a documentary. My father saw it as a bookish child already versed in the history of his world, and later told me that he started choking on his soda five minutes in and didn't regain control of his breathing until he left the theatre with friends willing to miss the best part in favor of spending ten minutes pounding on his back.

This is the way *Airless Fury* tells the story.

Malcolm Bell is a grizzled veteran of the Trans-Tibetan conflict, sick of war, and unable to cope with the memories as long as he remains on Earth. The instant the lunar colonies open up for terrestrial settlers, he applies for a spot and is approved for emigration. He settles in at Li-Tsiu, the first town to accept families, with no ambitions grander than finding work as an environmental engineer, and perhaps meeting a nice girl so he can start the family he's always wanted.

Then Ken Destry, who had fought alongside Bell during the war, moves in, bringing his vicious streak with him. Destry steals what he wants, bullies whoever he wants, and flouts the law whenever he wants.

Bell, a peaceable sort, tries to reason with the man, but doesn't take matters into his own hands until

Destry, by now wholly out of control, unleashes the full force of his own violent lusts on Connie Perkins, who has only hours earlier accepted Bell's proposal of marriage. Enraged, doing “what a man's gotta do,” Bell dons a moonsuit and tracks Destry across the pitted surface, in a quest that ends with both men firing at one another with the home-made projectile weapons that both have improvised from construction materials left lying around during the construction of the Armstrong dome.

Cold Roses, filmed years after Bell entered his self-imposed exile, presented the actual facts of the story, at the expense of much dramatic tension, but failed to erase the lies already set in place. Long before then, he'd come up with a famous response for admirers who wanted to know how much of *Airless Fury* was accurate. That consisted of a pained look and the simple understatement, “It's true that we were all on the Moon.” In real life, Bell had never seen combat, in the Trans-Tibetan War or any other. He had never met Ken Destry, either in his previous life on Earth or at any point prior to the incident that planted the seeds of his enduring fame. He went to the Moon not as a refugee winning a lottery, but as a qualified professional with a long resume in his field, who got the job in part because his wife Connie was already working there and was able to pull the strings that found him a position ahead of several applicants with better test scores. Both were on the Moon long before the powers-that-be decided it was time to start recruiting settlers.

Destry's erratic behavior did render him a menace, but had less to do with any innate meanness in his personal makeup than with degenerative brain damage caused by industrial contaminants in the air supply of the barge he drove back and forth between construction sites, twelve hours a day. He certainly bears no resemblance to the sneering villain familiar from so many versions of his story. Free will was so much not a factor in his conduct that his parents back on Earth received not only his full pension from the Lunar Authority, but also a hefty cash settlement from the company that produced the faulty canisters. In fact, five other lunar residents, who were also exposed to the toxic air but were pulled from their assignments before they suffered permanent damage, received smaller settlements. All had reported feeling on edge lately, though how much that was due to the contamination and how much was just the extreme stress of their duties, remains open to debate.

Finally, it's true that Destry improvised a rail-gun and did fire on several of the search parties looking for him, causing several injuries but no deaths. But the unfinished Armstrong Dome *Airless Fury* uses as one famous backdrop had nothing to do with the incident, as that landmark was years away from being needed, let alone proposed, designed, or even partially built.

Airless Fury ends with a furious Malcolm Bell, who has tracked Ken Destry across the Moon's surface, catching up with him on foot, after a chase that has lasted several days. In real life, Bell had no intention of ever running across Destry. Like everybody else on the Moon, he had heard of Destry's rampage and followed all the recommended security procedures for keeping out of Destry's way. He'd even signed on to the general consensus, common once a full week had elapsed without a Destry incident, that the poor man had probably run out of air or food or otherwise succumbed to his condition. But once things began returning to normal, and his own duties began to require a daily commute from his home warren to a new one being excavated thirty kilometers away, he became one of several lunar workers carrying their own railguns just in case the general consensus turned out to be wrong.

Airless Fury got most of the story wrong. It invented some stuff. It omitted other stuff. It left out the single most important fact about the incident, one known only to people who lived on the Moon at the time.

All that said, even *Airless Fury* was right about one thing.

There certainly was a gunfight.

* * * *

I still didn't know whether Bell's claims of a suit-shredding security system were at all accurate, but I saw no point in testing them. I turned when he told me and stepped where he told me and at one point backtracked several steps because he claimed to have miscalculated and led me over an array he called the Valley of Death, where a single misstep would have reduced my suit to what he called “a loose mesh more appropriate as a bathing suit than as something you'd find useful in vacuum.” By then I was more than half sure that the system belonged to the same species of bullshit as most versions of the gunfight story. A few years later, when he disappeared, leaving in his place the phenomenon that has made his homestead a quarantined site ever since, the authorities searched the land around his sealed habitat and found out that it was all true, a revelation that made my skin prickle from the imagined sensation of blood bubbling in cold vacuum.

But that day I followed his directions and made it inside his airlock in a state resembling the same confidence I'd felt since first plotting this madness of mine. It was a standard box of a chamber, only one square meter at its base, but so squat as far as height was concerned that even I, with my slight dimensions, had to stoop in order to enter. I tried to imagine Bell using it to go in and out and remembered reading that most of the pioneers had been small people, chosen as much for their ability to fit into tight spaces as they were for the length and breadth of their professional resumes. Any illusions I might have had about meeting a legend who would tower over me like some kind of Greek god, his mighty forehead scraping the clouds ... were stupid on their very face, but remained intact anyway. I knew the stories were bullshit. But this was *Malcolm Bell*, dammit. Bullshit or not, meeting him was like meeting William Tell, Robin Hood ... or Wyatt Earp.

The door behind me slid shut, the quaint seal around the rim inflating to produce a seal in a technology that might have been considered old-fashioned when I was born. A few seconds later, I started hearing ambient sound: the hissing of external air, the metallic sound of my boots shifting against the dust-catching grill below. But even as the indicator light over the inner doorway flashed green, I continued to wait.

His voice crackled over the speakers. “It's safe. You can take your helmet off, if you want."

I made no move. “Are you going to open the inner door?"

"I haven't decided yet. But you might as well make yourself comfortable. I promise: I'm not the type to expose an obnoxious busybody to vacuum."

Yes. *But you are the type to surround your home with deathtraps, or at least to say that you have*. And yet, what choice did I have? Even in a room stocked with all the air I could breathe in a lifetime, I could still asphyxiate behind the seal of a suit that refused to allow any of it in. So I unlocked my helmet, taking a groundhog's pleasure in the sibilant hiss of my suit's pressure equalizing with the somewhat greater concentration of the airlock booth.

Traveling from one pressurized environment to another, you can learn a lot about what somebody's like from your first taste of their air. In the last few weeks, during my interviews with people who had known Bell back in the day, I'd visited some private habitats inhabited by people who had long since lost the ability to smell themselves and whose stench was thick enough to bring tears to my eyes. Bell's had the slightest tinge of old-man scent, sweet in a way that suggested daily ingestion of cough drops, but was downright pleasant by comparison. I could even make out some kind of exotic, flowery tinge, which reminded me of the tropical exhibit at Shepardville's Botanical Gardens: perfume, scented cleaning fluid, or perhaps an indication that the winner of the Moon's most famous gunfight now spent his years cultivating flowers under a sun lamp. Why not? He had to be doing *something* in here, all these years.

Either way, I found myself enjoying it. “Thank you."

"You're not welcome," he said. "This is an unconscionable imposition on my time and privacy. Tell the truth, I'm showing you far more hospitality than you deserve."

I shifted weight from one foot to the other, to cover the embarrassment that made the hackles rise on the back of my neck. "I know. And I'm sorry. Whether it makes a difference or not ... I do appreciate it." I waited several long seconds for a response, received none, and ventured, "Maybe I should tell you why I'm here?"

"You don't have to, Miss Jessie James. There are only a few things this can be about. Either you want to write a book about me, or you need to tell me what I've always meant to you, or you want a famous person's willing participation in an anecdote that you'll later be able to share with your family and friends. Whatever the particulars, it amounts to nothing more than wanting to approach a monument, chip off a piece for yourself, and walk away carrying it in your pants pocket. This would not be a problem if I wasn't a man, and there weren't so many of you, wanting your own pieces, that if I let all of you have what you want there wouldn't be any of me still left for myself. You want the gunfight story? Go download *Cold Roses*. It's pretentious and overwrought, but got at least half of the facts right, all without asking me a single damned thing."

Another man might have delivered all of that as a plaintive, hysterical rant. From his mouth it sounded like resignation, born from years of sad experience. I wondered how many pushy curiosity-seekers he'd needed to admit as far as his airlock. "I've seen *Cold Roses*, sir. It didn't tell me what I needed to know."

"Then download the Commission's report. It's the result of a hearing that lasted six weeks, and includes enough detail to choke Oswald Spengler. Unless you're one of those touchy-feelie types who want to know *what it was like*, in which case I have no answer more eloquent than, *I didn't have time to stop and think about it.*"

His anger didn't delay me one heartbeat, but I did need several seconds to fight my way clear of that reference to Spengler, whose *Decline of the West* I had not then read and would not touch until several years into my own self-imposed exile. "No, sir. I don't need to know about the gunfight. I already know everything I want to know about the gunfight."

There was another pause, shorter this time. "And that is?"

"You armed yourself in response to a possible threat from a colleague deranged through no fault of his own. He fired on your barge. You fled the vehicle and returned fire. The confrontation lasted several minutes, but sooner or later one of you had to hit his target. The lucky survivor happened to be you. You almost lost your commission, in part because of some zealous prosecutors who accused you of being as dangerous as the man you were fighting, but were cleared of all charges. The tale's grown in the telling and you've been living down your reputation as a hero ever since. But everything else, sir, is just drawing dotted lines between the places where you stood and the places where your rounds hit their respective targets. It's been dissected and analyzed from every possible angle, hundreds of times, by people far smarter or far more obsessive than I am, and I wouldn't be here, taking up your time, if all I wanted to do is travel that same ground all over again. For what it's worth, I'm not even a historian. Whether you believe it or not, sir, I have a *reason* to be here."

When he spoke again, his voice betrayed a respect I hadn't heard there before. "How old are you, young lady?"

"Twenty-four."

"I thought I detected the arrogance of youth. You do know that I haven't allowed anybody past the airlock since some six years before you were born?"

"Yes, sir. And if you don't mind me saying so, it sounds damned pointlessly lonely."

The words surprised me as much as they must have surprised him. Nothing like them had appeared anywhere on my long list of strategies for getting him to drop the habit of a lifetime and speak to me. Even now, I found them mortifying. I would have pulled the very sentiment from the air, and tucked it away in my pocket, had there been any way of catching up with it and dragging it back. I found myself cringing, half-expecting him to open the outer door and flush me back into vacuum, where all impudent snots belonged.

He surprised me by guffawing.

Malcolm Bell laughed that hard maybe four times in all the time we knew each other. It was a number exactly equal to the number of times he laughed at all. Other people had varying intensity settings, ranging from polite chuckles to uncontrollable giggles. Bell was more than capable of being amused by things other people said, but never laughed out loud unless he could devote his entire being to it, and when he did, it always took him some time to stop.

I must say that I've spent a lot of years missing that sound. There's a certain amount of personal pride that comes with being able to make it happen.

On that day I thought it would never end. But even it trailed off eventually. And he said, “Every thirty years or so, the human race surprises me by producing someone worth making exceptions for. You have your audience, Jessie James."

The inner door slid open...

* * * *

In just about every version of the Gunfight at the O.K. Corral, Wyatt Earp is a tower of strength, more titan than man, so certain of his own rectitude that it might as well have been this certainty that prevented him from being pierced by any of the bullets fired on that dusty street on Tombstone.

It might even be true.

Certainly, it's remarkable enough that a man who lived the way he did never did feel the sting of a bullet himself. So many of the legends of his day did. Jesse James, Billy the Kid, and Wild Bill Hickok all died that way—some backshot, others facing their enemies, but all as prone to the effects of violence as any other man. Earp's own body remained inviolate.

The inescapable impression is that when he stood before the Clantons, exchanging a flurry of bullets at point-blank range, he was tall and unafraid, as aware of his own invulnerability as future generations would be, when they saw his story told and retold in one medium after another.

Again, maybe it's so. Maybe he was just crazy enough to think that the laws of chance didn't apply to him.

And maybe he was terrified, and wishing he were anywhere else.

Malcolm Bell sits in the driver's seat of a Class B Lunar Barge, traveling maybe forty kilometers an hour as he makes his way to a solar array under construction on a ridge a three-hour drive from base. He is under cover, the better to keep his suit temperature within a comfortable mean, despite what will have to be a full day's trek under the pitiless unfiltered Sun, but as is typical for that time and state of technology, not under air. He is tired. He hasn't told anybody, but he's been having trouble sleeping these past few nights, and would have begged off this pain in the ass solo

detail, were the local work culture at all tolerant of such frivolities as sick days. Life here, the life they're still trying to build, is still too precarious for that. The motto is, If you can walk, you can work*, and Bell remains too mobile to spend the day in his bunk when he's part of the machine that makes life on this world possible.*

He knows this, but he is also a human being under stress that would break many other untrained men, so his mind is following fourteen separate trains of thought at once. Part of him is thinking about the drive he has already made a dozen times, but part is thinking of a fellow engineer who he considers a real ass, part is trying to remember the name of a popular singer who has been on the tip of his tongue all day, part is looking forward to getting some downtime when he can see his good friends Minnie and Earl, and part is thinking about that poor crazy son of a bitch, Destry.

Shit, Destry.

Bell knows he's being stupid. There's no point in worrying about Destry. Worrying about Destry is like worrying about lightning. It strikes or it doesn't, and if it wants you it will have you. All the worry accomplishes is ruining your day while you wait to find out if the dice rolls, one way or the other. Besides, Destry's got to be dead by now. There's no way he's still out here, running around so far from any supply drops, just looking for another wandering surface rat to ambush. He must be spam in a can, baking inside his suit, perhaps even bursting from his tin shell as the gases build up from within. It's a disgusting image, but the only possible one, because Destry's not some unstoppable monster, just a man with the immense misfortune to pull the wrong lottery ticket in the God-has-a-sense-of-humor sweepstakes.

Bell knows all this, in the same way he knows his service codes and his emergency procedures and the words to the current hit song with the easily-mocked lyrics that have burrowed into his skull and now refuse to leave, but he is also a human being, with a human being's capacity to dwell on bogeymen, and he has been dwelling on the image of his own head bursting into a fog of swiftly-dispersing vapor as his helmet is bisected by another of Destry's jury-rigged weapons. It's not suffering that frightens him. It's the unknowability of the moment. It's being alive one instant, and dead the next, without so much as a by-your-leave for realization. Why, this very thought, the one he's thinking now, could be the very last thought he'll ever have, and he'll never know it. Or maybe this one is the last. Or this one.

He is lucky that he happens to be not only looking in the right direction but also working himself into a fine state of paranoia when the projectile shatters the air gauge on the control panel before him. This is a vacuum, after all. There is no audible distant gunshot, no musical crunch as the transparency covering the display surface turns to shrapnel. There is just a hole where no hole existed before, and were he not thinking of Destry he could very easily hand himself over to the slaughter by wasting the next few seconds wondering what kind of mechanical blowout could have caused such a catastrophic malfunction. Instead he realizes at once that Destry must be firing at him, from one of the jagged hills that overlook this now well-traveled road. He is therefore already hurling himself to the left—that direction chosen only because it is the nearest way out of there—when a second projectile passes through the spot where he'd been standing and imbeds itself in the control panel, its only lasting effect to provide further grist for the future storytelling mill.

Objects on the Moon fall slowly, by terrestrial standards, even if they don't want to, and Bell's desperate dodge develops a certain slapstick flavor as he sinks toward the rocky ground—a good two meters below him, thanks to the barge's oversize treads—not at all rushed by the knowledge

that there's somebody shooting at him. He is even able to begin his frantic call for help before he hits and commences to roll. “Bell to Control! Request immediate assistance!"

Cliff McRae is the comm-op riding the console that day. He's from some nowhere in the Texas Panhandle and speaks with an exaggerated version of the cowboy twang that has flavored a disproportionate percentage of NASA's public speakers for over a century now. “We copy, Bell. What's the nature of your problem?"

Bell is still tumbling beside the barge he has abandoned. He owes his life to the conservation of momentum, as his trajectory parallels the vehicle's forward motion, and thus keeps in its shadow where he is shielded, for the moment, from his attacker's line of fire. This will change in a second, if he cannot regain his feet and keep up. He gasps, “I'm being fired upon from the ridge!"

McRae's pause lasts a full five seconds. “I'm tracking your location, Mr. Bell. I see you south of Route 7, marker seventeen. Is that affirmative?"

"That's the route. I don't know the marker. I've abandoned the barge, which is still in motion, and am using it for cover."

"Have you positive ID on the shooter?"

"Hell, no, I don't have positive ID! But just how many crazed snipers do we have on this hunk of rock?"

There's grim amusement in McRae's reply. “Copied. Stay covered, Malcolm. We're working on getting you on some reinforcements."

Meanwhile, Bell has managed to regain his feet and now hustles alongside the barge, which is continuing to roll at a speed he can match as long as he keeps to a slow jog. It's not easy going. Moonsuits are not made for running, nor is lunar gravity. A normal run for a human being involves a certain number of moments between steps, when both feet are off the ground at the same time, moments when the runner uses gravity to his advantage, and that the Moon insists on using as opportunities for slow-motion ballet. It's possible to compensate and build up a speed significantly in excess of what the same legs would achieve on Earth, but you pretty much have to be raised on the Moon to pick up the knack.

Bell was born on Earth.

In Tombstone, Arizona.

Running alongside the barge is a stopgap solution at best. True, it does not have a dead man's switch. That safety measure had long ago been deemed more dangerous than the vehicle could possibly be even as a runaway, since on the Moon it's far more important to get a failing or incapacitated operator who's at least headed in the right direction back to base and under air. Truth is, the barge is currently following buried magnetic markers that guide it along a preprogrammed route. But it moves slowly enough for any halfway intelligent sniper, even he's also a deranged one, to scramble down from his position and take a shot from another angle. Staying close won't keep Bell out of the line of fire for long.

McRae returns. “Bell? Do you read?"

"I'm working on it."

"We have three units converging on your position, and are working on getting more. Earliest ETA

is thirty minutes. You are advised to keep moving and not attempt to engage Destry unless he forces the confrontation. Do you read?"

"I read," Bell says. He has a bad thought. "Listen, he might be monitoring this. We better observe radio silence until your people get closer. I wouldn't want to lead him right to me."

"Good thinking, Bell. Signing off now."

Bell regrets the silence the instant the signal cuts out. After all, that might have been the last conversation he'll ever have with another human being. Would it be that bad to stay on the line? After all, if Destry is monitoring him, the crazy fool now knows that he's had a chance to call help. Wouldn't that send him running? Is he that crazy, to stick around and expose himself to an army of rescuers?

It seems unlikely. Mad, *even.*

Living in the moment, Bell feels the truth anyway.

Destry is exactly that mad, and stalking him.

* * * *

I didn't know what to expect in Bell's habitat. I had been to a number of other tin cans in the last few months, and had seen interiors that pinged every graph point from pig-sty to robotically antiseptic. I'd even dealt with one well-known figure from the early colonization days, never mind who, whose place was draped with enough pink diaphanous cloth to outfit the classical Turkish harem—and he even dressed the part, though not, I'm sorry to say, playing the part of the sultan. I don't care how curious you are. You honestly don't want to know the name.

As if in contrast, Bell's place was austere to the point of sterility. Function was all. The only real concessions were to comfort, as in the sonic shower with emitters mounted not only on the ceiling, but also along the walls and even in the floor tiles. The bed was made, but configured to recliner outline. There were no artifacts I didn't recognize, except for a purplish vase shiny enough to cast starbursts wherever it captured the overhead light. It was translucent enough to reveal that it held a substance I supposed to be lunar soil. Not unusual: the stuff is way fertile, and this wouldn't be the first time a lunar resident collected some for use in his indoor garden.

Bell himself was ancient. That I'd expected. He'd been seventy when he acquired this place as his forwarding address, and well into his eighties the last time he ventured as far as the nearest center of population. The last photograph I had of him had been taken by one member of the appreciative crowd that had followed him around on that occasion. He'd been so rail-thin he'd seemed more vertical slash than man, so hesitant in his gait that my eyewitness reported half-expecting those brittle bones to shatter with every step. His few strands of remaining hair, allowed to grow long as if out of disdain for the waste of time trimming them would be, floated above his dark, liver-spotted scalp like cirrus clouds passing above the curvature of the Earth.

Bell hadn't answered any questions on that day. From all reports, he'd seemed so overwhelmed by all the attention, so upset by all the questions shouted his way by a crowd that insisted on demanding details about his legendary past, that any intelligence still at play behind those dark brown eyes had disappeared behind a fog of age and confusion. My witness to his visit, groping for a way to describe Bell's demeanor, on that sad, pathetic visit, seized on stories his grandparents had told him, about a degenerative disease called Alzheimer's, often associated with advanced years, that had once upon a time been notorious for robbing its victims of thought, memory, and any connection to the people they once were. There was no way Bell could have that. The syndrome didn't exist any more. But my witness had wondered if he could

have something like it. He said that it was the only way to reconcile the icon Bell had been with the shuffling, frightened figure Bell had become.

The Bell I saw now was clearly a man approaching the end of his first century, but his eyes were bright, his movements sure, his speech clear and unslurred by stroke. The son of a bitch even had hair: a full head of dirty cotton wool, a sharp contrast to the light tan of his skin. Some of the old bastards I'd met went days without shaving, but his chin was smooth, his clothing laundered and unfrayed at the seams.

Old. Like I said, ancient. But not decrepit. He was still taking care of himself.

Either he'd gotten better, or his prior fragility had been one hell of an act.

I knew he had to be looking at me. From all available records, he had liked his women, and I was his first female visitor in decades. There was not much to ogle, considering that everything I had was still hidden beneath the bulky lines of my moonsuit. But I had a cute face in those days, if you're willing to count that eccentric form of cuteness that comes only when the right combination of otherwise awkward features collide in ways that cannot be predicted from even the most exhaustive list of the ways they're less than ideal when described one at a time. I used to thank God for my big brown eyes, which bound them all together in one acceptable package. They sometimes fooled people into thinking I was beautiful. Without them compensating as heroically as they did, I might have needed to take up residence in a zoo.

He pulled a modular chair from its housing under the retractable desk, indicated that I should make myself comfortable there, and sat on the edge of his bed, his spine as straight as a rod. He gave a doleful shake of his head. “I declare, young lady. In some enlightened societies you'd be boiled in oil."

"That's never happened, sir. But I have been stoned, from time to time."

His lips twitched. “Charming. Gutsy. Well-read enough to possess a working knowledge of antiquarian slang. And a hell of lot prettier than the old photos I've seen of your badman namesake. Were I eighty years younger, I might be honestly tempted by you."

"Thank you, sir."

"It's not a compliment. Just the simple truth.” He appraised me some more. “You said you're not a historian, meaning that whatever you seek to learn from me you don't expect to teach a seminar of yawning, blank-eyed students. You're also not a reporter. I get that from the fact that reporters are generally only interested in the most obvious thing and you've already said you have no interest in discussing the most obvious thing. For pretty much the same reason, I'm also fairly confident in declaring that you're not some starry-eyed hero worshipper who's been just aching to meet me since childhood. Am I correct so far?"

"Yes, sir."

"Then I must confess bafflement. So what are you professionally?"

"I'm a junior auditor for the Lunar Internal Revenue Service."

His eyes widened just enough to reveal the white surrounding all sides of those lucid brown irises. Something that might have been hilarity tugged at his jaw muscles, as he ventured, “Am I going to be sorry I allowed you in here? Are you really just a third-rate functionary intent on impressing her bosses by shining your mighty proctoscope into the moribund finances of a crazy old man?"

"No, sir. My bosses have no idea I'm here."

"I should say so. I know damn well I owe no stupid taxes."

I gave him a measured look. “None at all, sir. Not for thirty years."

Without so much as a single line filling in, he seemed to shed a decade in a heartbeat. Once again, the smile tugged at the corners of his lips. “Continue."

"Can I have some water first?"

"Be my guest."

Rather than get up and avail myself to his own supplies I sipped from the straw built into my suit's collar ring, wincing at the unpleasant warmth of the water—which was a lot like hot coffee, only without flavor. It was pretty piss-poor testimony to the efficacy of my reservoir's insulated lining, but it was enough to clear the dust from my throat. “Well, you've got to understand. I'm the fresh meat in the office, so I get all the busywork, doing reports nobody's ever going to read."

"Bureaucracy being the same animal it always was."

"Right. Well, about a year ago, they assigned me to do a study on the differences between the tax burdens carried by Luna's various centers of population. There are always differences, you know, no matter how much the powers that be try to keep things equitable."

"Or looking that way,” he said.

"Right,” I said again. “We all know the system can't be fixed. It's always going to be unfair to somebody. Fix one inequity and you cause another one for someone else. The study was a total waste of time that was never going to lead to any substantive change ... but it was my assignment, so I dove into it, getting all the expected answers until I found one anomaly that just wouldn't let me go."

"Better come out with it, then. I'm an old man. Talking about taxes is taking up far too much of the time I have left."

He was not going to make me stammer. I'd spent too much time rehearsing this. “It came up when I encountered a small number of people who have been handed lifelong tax exemptions, people who don't have to pay a cent no matter how long they live. Some of them are members of the clergy, grandfathered in when the churches lost their exempt status. They're all elderly and beside the point. The rest are all Farside hermits like yourself. The usual explanation has always been that you're self-sufficient, have no declarable income, and use no government services. But I looked closer and found that it's not quite as simple as that. The Lunar Authority deeded your plots to you, in perpetuity. It paid for your habitats and continues to pay for your food drops, your oxygen, your maintenance, and your medical care. It also provides you with an income—a quite comfortable income—far in excess of anything you'd need for decades spent avoiding centers of population. That income is paid into an escrow account off-world, which few of you even touch, though some have it paid to family members or favorite charities, and one or two of you have finally given up on living the way you do in order to enjoy a well-funded retirement."

I took a deep breath. “Those are the cases I find interesting, sir. Whenever one of you rejoins humanity, your tax status reverts to normal. This is a clear indication that the Lunar Authority is *paying* you to live the way you do. Moreover, it also takes significant pains to ensure that the regions housing you remain undeveloped and that you are not pestered by any bureaucratic interference."

He favored me with another wry grin. “Current company excluded."

"Oh, did I give you the impression that there's anything at all official about this visit? Forgive me, sir. This

is me being a private citizen. It has to be. Any questions I asked about your status were either deflected or discouraged. I went to my highest-ranking supervisor to ask about you and was told that pressing the matter was a good way to torpedo my career."

"Which was," he guessed, "absolutely the wrong way to handle you."

I gave him the best shrug I could, which wasn't a very good one in my moonsuit. "Unfortunately, the best way to make sure I remain interested in something is to warn me it's none of my business."

He could only respond with the most doleful headshake possible. "Idiots. Five minutes with you and I could have told them that."

"So I investigated further and found that the vast majority of the crazy old men, and a few crazier old women, who have given up the company of other human beings in order to lock themselves up in tin cans on Farside, worked those early construction projects at the same time you did. About 60 percent of them lived in the temporary warrens during the same five-year period. Considering that there were, at most, a few thousand people cycling in and out at the time, the odds of that many people from a single population segment all deciding to become hermits in their dotage become downright astronomical. It only got worse once I examined the records more closely and determined that the chances of any first-generation moon rat taking the same late-life path you did only increased the closer their respective tours of duty coincided with one particular day.

"Once I identified that date and found the one element that made it unique, I found a certain clever way to test my results. I researched moon rats who worked the construction sites before and after that day but who happened to be on leave, or off-world, or even incapacitated due to illness or injury, on the day itself. There were about thirty of them. Not one of them became a Farside hermit. But of all the people who were on duty, on that particular day? More than fifty have.

"And it's not just a time correlation we're talking about. The chances of one of your co-workers becoming a Farside hermit increases exponentially with their proximity to a certain location on that date. Of the six men and two women who were first on the scene, answering a famous distress call, five lived to age eighty—and all became Farside hermits at about that age. Of all the hundreds of moon rats working Station C, some two hundred kilometers away, none of whom had any direct contact with that prior group until some fourteen days later ... maybe twenty did. So what we're talking about here, sir, is a pair of overlapping bell curves, both centered on the same time and location. The same *event*."

I realized my heart was pounding. The shape of this thing I saw was that big, and I had now come close enough to feel its gravity, pulling on my skin. I had to take another sip of unpleasantly warm water, and take another deep breath, before continuing. "Forgive me, Mr. Bell. If it was just you, I'd understand. Post-traumatic stress disorder. If it was just you and a couple of others, I'd understand that too. People get bitter in their old age. If it was just more than a thousand with no apparent connection between them, I'd write that off as well. Humanity's a funny beast. But when all the evidence indicates a single common denominator ... and when you consider the active collaboration of the Lunar Authority itself ... then all those rationalizations fail. What we have, sir, is a mystery too big to put down, no matter how much I try. And you're at the center of it."

I spread my arms. "I need to know. What *else* happened on the day of the gunfight?"

It took me a second to realize that I was alone in the habitat.

I'd been talking for five minutes, all in preparation for the question that had taken over my life, over the last year. But at the actual moment I asked the critical question, I'd gathered up all my hope and fear and all my need to know ... and looked down at my own lap, afraid to face him now that the issue was out in

the open between us.

It must have happened during that moment.

But it was only after I perceived the silence, maybe a full second later, that I looked up, registered what I was looking at, and felt a great black pit open up underneath me.

Malcolm Bell was gone.

* * * *

Paranoia can be a survival mechanism.

It's especially so on the Moon, where a lone man being stalked by a deranged colleague cannot be alerted by the sound of boots scraping across soil only a few meters behind him.

Jogging alongside the barge, his field of vision already truncated by the dimensions of his faceplate, Malcolm Bell is more paranoid than most. He whirls every few seconds or so, each time certain that the action is about to reveal the approaching figure of Ken Destry, drawing down on him from point-blank range. Each time he whirls, surveying the dead landscape behind him and the dead landscape to his left and just to be sure the dead road stretching out before him, he knows that he's too late, and that he's accomplishing nothing but a close look at the man determined to kill him.

This is not terror. Not exactly. Malcolm Bell works in a dangerous environment alongside other men and women who risk death just by being there, and though like most of them he wonders in his private moments whether he's truly up to it, he's determined to be as brave about this as they'd want him to be.

If he must die, it won't be as a coward.

So it's not terror Bell feels. It's something else, and it takes him several minutes of this silliness to finally identify it. It's instinct, trying to save his life.

There is no particular reason he should listen to it. He doesn't have enough data to map where Destry is, relative to his own position, and cannot say for sure whether walking alongside the barge is more or less dangerous than any other plan. But he knows it as well as he knows his own name. Destry is nearby, working his way around the rear of the barge. Continuing onward, in this position, gives Bell a life expectancy of minutes.

He doesn't want to be separated from the barge, because it offers the only protection he can count on, until help arrives. But while it is moving slowly enough for him to keep up with it, and even overtake it if he has to, climbing aboard in these conditions is going to cost him precious seconds. Bell finds himself eerily certain that if he simply grabs a rung and pulls himself up, it will be then that Destry comes jogging around the rear of the barge to blow a hole in him.

So he scans the landscape up ahead, looking for an advantage. And he spots one, in the form of a small rise, maybe half his own height, some twenty meters ahead of him. As he draws closer, he sees it's a freestanding boulder of some kind, maybe meteor debris, maybe the tumbled remains of some rockslide off one of the nearby ridges. There's nothing to distinguish it from any other of the other geological crap that makes day-to-day sightseeing on the lunar surface so nonstop delightful. He's passed it a thousand times, following this route, without ever noticing it. Now, he finds that he loves it about as much as any man could possibly love a rock, so much in fact that had he the time to be giddy about this he might actually offer to marry it.

He loves it because it's where he needs it to be.

An instant of frenzied calculation and he puts on the speed, focusing on that boulder as if it's the most important thing in the known universe.

Again, it's not a graceful run. There is no such thing for men born elsewhere, wearing moonsuits that render their every move ponderous, in gravity that turns the steadiest gallop into a series of unwanted headlong leaps. But Bell, widely considered one of the clumsiest bastards employed in the construction project, finds himself calculating every step with a clarity that always eluded him before. And a good thing, too: for even as he covered half the distance between himself and that wonderful rock, he sees a spot on its surface pop in a little silent burst of dust, and knows that his paranoia has served him well. Ken Destry is behind him, shooting, and survival depends on pulling off this next move perfectly.

Bell leaps to the surface of the boulder, then kicks off to the right, aiming himself at the open cab of the barge, hoping to pass through the threshold and into the cage. It's a dangerous move, and not just because falling short is a good way to be ground to red pulp in the treads. It's a dangerous move because even a minor mishap can be fatal. All he needs to become history is to scrape the edge of the hatch the wrong way, and rip a hole in his suit.

Bell threads the needle, bouncing along the corrugated floor of the cab like a stone, tossed slow-motion across the surface of a lake.

His momentum inevitably carries him through the other open hatch on the other side of the cab.

That's okay.

Because he pulls off another slick maneuver while passing through.

He grabs his handmade weapon and carries it with him as he sails out the other side and back onto lunar soil.

There.

Now the odds are even.

* * * *

Malcolm Bell had disappeared.

There had been no puff of smoke, no flash of light, no pop of displaced air.

Had there been any visual manifestation of his disappearance, I'd missed it. By accident or design he'd picked the one moment when I would not be able to add any other sensory cues to my general store of knowledge.

But he was no longer sitting on his bed.

Nor was there any question of him using my momentary inattention to dart out of sight and hide. This was a Farside hermit's habitat. There was a sonic shower (unoccupied) next to a head (unoccupied), storage cabinets (still sealed), a few alcoves too small to cast shadows sufficient to hide a human being (all within my direct line of sight).

I could argue a silent sliding panel of some kind, one that hid a closet-sized space just large enough to house an old man who wanted to play Houdini with the visiting rube. But I had an uncle once, a math

teacher, who taught me the best way to avoid panic when facing insoluble problems. He said: *Break them down into logic trees. At the very least, you'll separate what you can figure out from what you can't.*

There were only two possibilities here. Or, at least, two different categories of possibility, each the central root of a thousand more specific explanations that branched out from those central assumptions.

First category: Bell's disappearance had nothing to do with personal volition. He'd popped out of existence, or to another plane of existence, or just to the roulette table at the Fantazi Casino in Grissom Center, not because he'd wanted to shock and distress the busybody in his living room, but because of other forces beyond his control: say, some three-headed alien inputting the wrong coordinates in his personal teleportation booth a few hundred thousand light years away. Or maybe there'd been a Rapture. Whatever. However you constructed it, maybe he hadn't expected anything to happen, and was now sitting under a polka-dotted sky, wondering about the fresh madness that had just given his life a brand new dose of surreality.

The chief drawback of every theory that fit under this umbrella was that if it was beyond his control it was also beyond my control, and I'd just exchanged one set of mysteries for another, a billion times bigger, that I couldn't resolve just by asking a cranky old man a few intrusive questions. So I might as well not even try to explore any of the possibilities that sprung from this particular root. There was no point. By definition, they were beyond me.

So that left the only subcategory of possibility worth worrying about: that Bell had disappeared deliberately, on cue, whether by clever magic trick or extraordinary capability unknown to me.

If I followed that theory to the next set of branching possibilities, I was left with two more. Either he'd vanished knowing that I'd never be able to determine how, or he'd vanished knowing that I could.

If the first was true, I'd reached the deadest of all possible dead ends, and a life-ruining catastrophe as well, as I'd now have to explain why I'd be sending a distress signal from the home of a missing hero. If I took that route, I was in for weeks, maybe even a lifetime, of interrogation by investigators duty-bound to assume that I'd done something to the old man. But again, there was no real profit in exploring that possibility either. If it was just *bigger* than me, there was nothing I could do to ameliorate it.

But if he'd vanished knowing that I could figure out how...

...well, in that case, he'd left me everything I needed to figure out how.

So I took a deep breath and forced myself to examine his habitat inch by inch.

If there was one word that could have described the ambience, it was functional. There was not a single furnishing, not a single line, that deviated from the practical. He had no art, no knickknacks, no books beyond those he could call up using his links to the hytex network. His home was as austere as a monk's cell, and from all available evidence he wanted it that way.

Why would a man with a loving family and a sterling reputation do this to himself?

He had been sitting in plain sight, and had disappeared during the length of an eye blink. There'd been no time for him to secrete himself anywhere.

He had not gotten past me. That's the thing about sitting around in your moonsuit, in a chamber as small as a Farside hermit's habitat. You're big and bulky enough to block the entire central passageway. He couldn't have gotten past me without shoving me aside or bowling me over.

Occam's Razor held that explanations became more likely the closer I searched the areas nearest the bed. So I searched the bed.

Bell slept on a permafoam mattress, of the sort extruded by a liquid reservoir in the housing below him. The mattress never had to be cleaned, replaced, or hauled away, because the top layer evaporated on a daily basis, replaced by fresh foam as the reservoir extruded more foam to replace it. I'd never used one myself, but had heard that they were well worth the price for anybody with lower back problems. One touch with the palm of my hand and I sighed with envy, despite being half-crazy from other pressing concerns. A night on one of these, whether asleep or engaged in other activities, would be heaven. But its presence meant that he hadn't found some way to hide under the bed, because the only “under the bed” here would be a vacuum-sealed bladder and a reservoir filled with liquid solution.

The bulkhead that surrounded the bed on three sides was similarly unhelpful. It was solid metal, cold to the touch and absent any obvious seams, even at the corners. There were no sliding panels, no hidden doors, no places that rang hollow in a way that suggested hidden storage spaces behind them. When I took off my right glove and placed my bare hand on that wall, I felt the light vibration that all lunar residents look for, the one indicating that the machinery that makes all our lives possible was still humming away, still doing everything it could to provide the next breath, and the breath after that. This was no surprise. It was what I'd expected to feel. But it still left a serious shortage of answers.

I went back to my chair and sat down again, my eyes fixed on the slight depression his body had left on the permafoam.

Had there been a rug, I would have pulled it up, expecting to find a vertical shaft with a ladder, leading downward into darkness. Had there been any wall hangings, I would have searched for hidden passageways behind those. Had his food dispensary involved a refrigerator rather than a pair of spigots, I would have moved it aside. In any place that showed the touch of a human personality, there would have been any number of blind alleys to search. But this was just a tin box that had once contained an old man, that had then contained me as well, and that now contained only me.

The only anomaly in the entire habitat was the one thing he owned that showed any appreciation for form over function: that uncharacteristically gaudy vase.

What the hell. I picked it up.

It felt like glass, but softer. My fingers left indentations that popped back out and disappeared as soon as I let go. It was also cold to the touch, almost as if it had been refrigerated. I tilted it one way, then the other, watching the substance inside shift like the soil I'd supposed it to be. I sniffed the narrow opening and made a face. Whatever it was smelled like nothing else I'd ever encountered. It wasn't bad, but rather unfamiliar. I had no referent. After a moment I tilted the bottle further and poured a little, about a spoonful, onto the previously pristine countertop.

It wasn't lunar soil.

Whatever it was, it was as purple as the vessel that contained it and reflected the overhead light in the same eccentric manner. Most of it had the same texture as talc, but there were also luminescent crystals of some kind. Old-fashioned laundry powder was my first and most hopeless guess, but he was not likely to need it in a habitat that used sonics for cleansing.

I impaled the little pile with my index finger, and then, for no particular reason, just messing around as I tried to figure out what I was looking at, drew a little furrow along the countertop, my fingertip turning the mound into two ridges of approximately equal length.

I remember thinking, *This is pointless*.

Then the two ridges shifted, on their own, crossing the path I'd drawn between them to reunite into one contiguous pile.

What the hell?

Now one fat ridge, the pile waited for one heartbeat before contracting again, to reform the same irregular cone it had been when I first poured the powder onto the countertop. And I mean the same, exact cone. I would have been willing to bet that not a grain remained out of place, with respect to the places they had occupied before.

I cut the pile in half, moved one pile to the extreme far left of Bell's countertop, and moved the other to the extreme far right, carving both into S-shapes before leaving them alone to see what they would do.

The two powdery snakes retained their serpentine shapes and slithered toward one another, undulating exactly as a genuine sidewinder might, until coiling together in an exaggerated embrace, at the precise midway point between them. Then their outlines blurred, their substances mixed, and they became, once again, the same dull mound the stuff seemed to prefer, between rounds.

A toy. Like modeling clay, except with a reset button.

I poured out a little more, doubling the size of the mound, and separated the two halves again, this time creating a dam between them by the simple expedient of resting my arm on the countertop between them. This time the whatever-the-hell-it-was showed adaptability. The two piles approached each other, found my arm between them interfering in the happy reunion, and after a moment I could only describe as careful consideration, marched in unison along the length of my arm, to the place where I'd left a centimeter's clearance between the bulkhead and the tip of my finger. The two halves met and melded at that narrow crossing, reminding me of nothing so much as two long-lost travelers, scaling opposing faces of the same mountain, for a joyous reunion at the summit.

Behind me, Malcolm Bell said, “Yes, it's alive."

I whirled and spotted him, returned to the same bed where he'd been sitting before his disappearance. He was exactly the same man he'd been a few minutes earlier, except that the few strands of remaining hair now looked windblown and the furrows on his face now shone with sweat. He was grinning ear to ear, deeply entertained by my confusion.

"And intelligent,” he added.

The room spun. I stared down at the powder on the counter, now circling the base of the vase it had come from as if searching for the opening that would allow it to return home, and managed a weak, “What are you saying?"

He shook his head. “Your mind's big enough to accommodate it. You just have to throw out enough clutter to make room."

I glanced back at the counter. The powder was now streaming up the sheer side of the vase, scaling that slick surface as if wholly undeterred by gravity or common sense. My knees had turned to water. I backed away, lowered myself into the guest chair, and stared at him with something approaching awe. “It's alien, isn't it?"

"Yes."

"Y-you've made First Contact?"

Now he looked a little disappointed in me. “No, that pre-dated me. This stuff came from the fourth or fifth contact. Less than twenty years ago."

"What what what what *what!?"*

"Look, I'm an old man. I don't have time to break it gently. You came for the truth as I understand it, and I'm giving you the truth as I understand it. You're just going to have to keep up with me. Suffice it to say everybody working on the Moon at the time of the gunfight was already involved in a historic First Contact situation, one that had absolutely nothing to do with the much more unusual phenomenon Destry represented. We know it was unrelated because when it happened we trucked out by the homestead occupied by those other visitors—we called them Minnie and Earl, and they were two of the nicest folks you'd ever want to meet—and asked them what was up. They could only shrug and say it was a new one on them."

"What you're telling me ... it's not in the history books."

He shrugged. “Well, that's the thing about history. The people who put it down in books are so concerned about accuracy that they come to give what they're doing the weight of an exact science. When in truth it's nothing of the kind. It's the best available estimate."

I sipped some more water from my suit reservoir. It had cooled only a little, but its acrid warmth helped anchor me to the here and now in a way that a more palatable drink might not have. I held it in my mouth for several seconds before swallowing, and then faced the old man on the bed with something approaching calm. “Maybe you better just tell me the bottom line."

"The bottom line? Two moon rats shooting at each other was the very least important thing that happened that day. The bottom line below that? All of us old-timers with Farside hermitages are working on a project with unprecedented implications for the future of humanity. Everything else is footnote.” He lay back on his bed, cradling the back of his head in a basket formed of his own linked fingers. “If you want, you can leave it at that. I'll call you a ride back to civilization and we can pretend this never happened. Or I can explain the rest of it and you can say goodbye to any ambitions you might have of ending your days surrounded by fat grandchildren, because you *will* someday lock yourself up in a habitat just like mine. Whatever. It's your choice. I'll be outside, waiting."

Outside?

Before I could ask what he meant by that, he disappeared again.

And this time I was looking directly at him when he went.

It was no conjurer's illusion.

He lost dimensions one at a time, first going as flat as a photograph printed on poster board, then folding up again to become a straight up-and-down line, then becoming a single bright dot that subsequently disappeared itself, leaving a purple afterimage on my retina.

I need to confess something here.

I've only fainted once in my entire life. Just once. I don't recommend the experience, but I do understand it. It happens when your mind or body or emotions reach a point of absolute saturation and you can only benefit from being turned off for a while.

I'll bet you're assuming that this was the moment.

It wasn't, actually, but I came damn close. I felt my balance go, felt the world turn gray at the edges, felt my eyes start to roll up ... and thought to myself, *Dammit, no*.

It was that simple. I just refused to go. I gripped the edge of the countertop and squeezed, just hard enough to reassure myself of its solidity. I got my breathing back under control, devoted about ten seconds to figuring out what I was going to do next, and did the only sensible thing.

I sat back down in his chair and waited for him to return.

Because of his uncanny luck surviving gunfights, Wyatt Earp is generally imagined to have been a spectacular quick-draw artist and an even better shot. Many of the dramatizations of his adventures feature scenes where he performs ballistic miracles, like gallantly letting some desperado slap leather first, going for his own weapon only then, somehow taking aim before the desperado can get a bead on him, and more often than not showing enough mercy to wound and not kill. In some versions he literally shoots the gun out of the other guy's hand, without drawing blood.

This is the picture you see in the dictionary if you look up the word nonsense.

In the first place, the handguns of the era were nowhere near that accurate; quick-draw artists and master marksmen did exist, but the skill-set was specialized, and there weren't many folks willing to risk their own skins drawing down in contests with fixed rules. Nobody, not even Earp, would risk his life pulling a damned fool stunt like trying to shoot a gun out of an enemy's hand, not even if it was possible. Not when missing and getting gutshot in those years before effective surgery was a good way to spend your last few days sweating in agony on some filthy mattress, entering hell long before you actually died and found out for certain whether you were actually going down or up. The rule then was the same rule that still applies in contests where people find themselves obliged to shoot at one another: *If you must pull the trigger, then put the bastard down*.

In the second place, even if somebody did possess the accuracy posited by those stories, protracted gunfights rendered those skills irrelevant. Every single shot produced a cloud of gunpowder smoke, larger and more opaque than contemporary imaginations can possibly believe, the effect of any determined fusillade a curtain of haze that burned the eyes and obscured the position of the people firing on you. Hollywood provided clarity so audiences could tell who fired, who missed, who got wounded and who got killed, the very issues that were not always immediately clear to the real people who had stood on those dusty streets, fighting for their lives and helping to construct the lies that would be told about them. So that mythical gunfighter who could drill a hole through an ace of spades at fifty paces might not have been able to see the playing card at all.

Finally, the gunfight that ultimately made Wyatt Earp a legend was a most unusual day for him. He didn't have daily shootouts. His usual M.O., dealing with armed loudmouths, was to sneak up from behind and club them unconscious. It was dangerous and it was brutal and it minimized the number of dead bodies littering the streets of Tombstone, primarily by rendering far less likely the possibility that Earp himself would ever become one of them. It was also less than perfectly heroic and not exactly the kind of thing that builds legends; few dramatizations of his exploits acknowledge it at all.

Similarly, most of the stories about Malcolm Bell's quick thinking during the First Gunfight on the Moon turn him into some kind of crack-shot killing machine, up against one of the deadliest killers in the solar system.

I'm sorry, but that's not true either.

Ken Destry was a man addled by brain damage and suffering the organic after-effects of serious neurological malfunction. He was demented in the medical sense, his reflexes and capacity for abstract thought reduced to the absolute minimum possible for a man still remaining dangerous and mobile. Imagine a rabid dog, attacking everything that moves; it's dangerous enough, but it's also uncoordinated, confused, and in great pain. Similarly, Destry might not have known who he was, where he was, or even that his own life was in danger; he certainly hadn't recognized the one most important thing about the day, the thing that in a perfect world would have made him the legend and put his name on a par with all the great explorers of history. You want to be fair? On that day, there was no Ken Destry at all.

Hurtling from the cab of his barge for the second time in less than five minutes, Malcolm Bell had been determined to hit the ground in a controlled roll, the better to come up shooting.

It has not worked out that way.

Truth to tell, he's never been called upon to perform acrobatics of this sort in his moonsuit, and has completely misjudged both his landing and his duck-and-roll.

He hits the ground hard, his arms and legs flailing, his body rebounding off the sun baked lunar rock at an angle that leaves him airborne for a period that is probably only a second or two, but which his stressed mind experiences as long unbroken minutes. It is a miracle that he doesn't crack his faceplate or tear his suit or do himself so much damage inside that thin cocoon of life that Destry's desire to kill him will be reduced to sheer redundancy. He screams, braces himself in precisely the wrong way, and hurts himself more with his second landing than with his first.

Were this Earth, his slide across the loose Earth might do him some tactical good, by raising a cloud of dirt that would obscure his exact position even as it gives any enemy in sight a rough approximation. But this is the Moon. There's no air to slow the grit's return to the ground that birthed it. Ironically enough, Bell's bumpy landing is as clear to his unseen enemy as it would be to any bad guy in any Hollywood movie.

Bell has almost stopped sliding when he happens to see a rock about the size of his ungloved fist explode into gravel, less than a meter from his face.

He cannot tell where the shooter stands, so he does the best he can and attempts to roll. But the angle is wrong and the gear on his back is too bulky; it digs into the dirt and traps him on his side, a position that will take him precious seconds to escape. He sees another pair of impact points, one where his chest had been a second or so before, one hitting the dirt between his splayed legs. He knows, with absolute certainty, that he's blown it. That he's dead. That the next shot will impact his chest, or his faceplate, or the backpack that keeps him alive in this place but is still so bulky and unnatural and goddamned inconvenient that it's about to kill him anyway.

He knows that even firing is a waste of time. He has no idea where Ken Destry is. He has no time to aim. And last time he fired a weapon he was a lousy shot anyway. But one chance in a million of survival is better than absolutely none, and so he scans the landscape, looking for the shape of a man.

Miracle of miracles, he sees something about twenty meters away: the shape of Ken Destry, trudging toward him. It is not the gait of a healthy man. Destry's dragging one leg and hesitating before every step, as if needing to debate it first with the parliament of voices that must be vying for supremacy within his compromised brain. Bell would not be surprised to see Destry stiffen up and fall face down before narrowing the distance between them; but he feels a special madness of his own now, one that supersedes any fears he might have about base survival.

For a heartbeat, dancing on the edge of that madness, knowing that he must have cracked his skull in the fall, Bell gibbers. It's total nonsense syllabification, nothing more. In less than a day he will listen to the playback and marvel over how close he came to losing his mind at this moment. Maybe he did. Maybe it's madness that will shape him, that will guide his decisions, for the rest of the life he is now destined to spend as icon.

But then Destry stops and raises his homemade rail gun into firing position.

Malcolm Bell is still, miraculously, holding his. He will never remember firing.

* * * *

Bell reappeared maybe forty minutes after leaving me alone to think. I was looking right at him this time, and was able to follow the evolution from point of light to vertical line to two-dimensional cardboard cutout of a man, though it all happened in less than an eye blink and I could not be sure whether I'd actually seen it or whether it was something my mind had concocted over a fleeting impression. Even expecting it, I came close to fainting. Even frightened, I held on to consciousness anyway. If he was testing me, I wanted to pass.

When he grinned at me, age formed crevasses in both cheeks. “I must have looked like that, that last second before Destry and I drew on each other. It wasn't the first shock I'd ever had, in the old days—learning that we'd already made First Contact was pretty big, all by itself—but it was the worst. It changed me. Want a drink?"

"Water?” I said.

"Hell no, *water*. This is like losing your virginity, and calls for a good stiff belt."

I managed a nod. He fussed around in one of his cabinets and handed me a plastic tube filled with something that looked like orange soda. I popped the membrane and took a suck. It was not an orange soda. I blinked and decided that while I'd enjoyed the experience, it would be wisest to avoid the second sip until the habitat stopped spinning.

"That,” he said, “is fermented *druhz*, a flowering organism from a world about five hundred and twenty light years from here. I'm not the asshole who first came up with the idea of making alcohol from it, but I must confess a hand in the construction of the world's first still. I'm afraid I can't give you some to take home; the Lunar Authority enforces a law mandating life imprisonment for anybody who attempts to smuggle it off Farside."

"That dangerous?” I croaked.

"No. That secret. We wouldn't want some talented biochemist to analyze it and come up with anomalies testifying to its origin outside the solar system. You can have as much you want inside these four walls, but I'd advise discretion. The stuff packs a real kick."

I was just beginning to see how much; my head felt like it was inflating. “You can't fool me, Bell. You just like getting young girls drunk."

He snorted, though not without pleasure. “Never needed to, really.” But he took the tube from me and restored it to its rightful place in the cabinet, before sitting on the edge of his bed and giving me the most appraising of all appraising eyes. “So have you decided, Jessie James? Do you want me to call you a ride out of here or do you want to hear the rest of it?"

The question struck me as a formality, taken by a man who could already see what I'd decided from the

look on my face. “I'm listening."

"Right. Bottom line, something discovered by a whole lot of people who've lived through great historical events: The dramatic parts aren't always the parts that prove most pivotal over time. The Great Wall of China was not an effective barrier to invaders, the Pony Express was a total financial failure, and the gunfight between myself and Ken Destry was a stupid, sordid human tragedy that wouldn't have made a damned bit of difference to anybody's life but my own ... except for the one part that we've kept secret, the part that only gets told to promising people who ask the most promising questions.

"The point is, even I don't remember the gunfight. Not in any real sense.

"And it's not because I found it so traumatic or because I've gotten too old to remember what I had for breakfast this morning. The point is, nobody remembers anything. None of us do. The way the human mind works, I'm not the same entity that experienced the events we're talking about. I'm the entity that developed from that entity. I have a different mind than the one I had then, and when I think about what happened that day, or any other day, I'm not so much calling up the actual experience as reconstituting the same neurological connections that called up that reconstituted experience last time. What I'm remembering, really, is how to construct the software that simulates the same memory I simulated the last time I bothered to think about it. Follow me?"

It may have been the alcohol, but he'd lost me in record time. “I'm not sure I do...."

He didn't get upset or angry, as I'd feared. “You know what it's like to sit here, with me, and listen to me go on. You have a firm grip on that experience, because it's happening now. But everything in long-term memory is an approximation, stored in a filing system that is not so much a collection of clear snapshots as a collection of instructions for reconstituting flawed approximations of those experiences. For instance, my brain knows that linking a certain number of neurons will call back the taste of my mother's cherry cobbler, and if I don't allow myself to question it, I will grin with nostalgia and reflect that the old broad sure knew how to bake. But what I'm actually remembering, when I think about Mom's cobbler, is a copy of a copy of a copy of a copy. It may not even be close to what actually happened. In fact, it almost certainly isn't, because the signal has been degraded, over time, by factors that include my own desire to be charitable to that old woman's memory, and separate memories of other great cherry cobblers I have known. You follow?"

I couldn't fathom what this had to do with anything. “This sounds like just a long-winded way of saying that your memories have changed over time."

"You still don't get it. To us, the past is nothing but the cat inside Schroedinger's Box, which we alter in a thousand different ways via our flawed attempts to observe it. It may be that on some level, every two people arguing at length over the precise sequence of events they both remember, are both arguing from positions of equal authority. Inside their heads, *they're both right*. Because it's what's inside their heads that, to some extent, defines the reality they're remembering. Or to put it another way, the precise taste of my mother's cherry cobbler no longer exists, because it only existed in my perceptions in the first place. My current perceptions, a copy of a copy of a copy of a copy, are the only way to measure it now, so they've changed the reality. They define what the taste *always was*."

I shook my head. “I'm sorry, sir, but I don't see that as anything but semantic ... bullshit. There's got to be some room for objective truth."

"And there is,” Bell said. “We can't all decide to believe in Santa Claus and call that bearded old gent into being just because we want the company of somebody like him. Our influence on everyday life is just not that powerful, and the consensus has a leveling effect that prevents any one of us from getting up to

too much mischief. But what I discovered that day—what Ken Destry really discovered, if you want to be fully fair about it—is that past and even present objective reality turns out to be a hell of a lot more responsive to our perceptions than anybody ever guessed. Given sufficient encouragement, we can make any number of localized changes as long as we avoid an overwhelming consensus to the effect that we can't. Do you follow me yet?"

It sounded like total gobbledygook. I tried to say something encouraging, but couldn't make my mouth form it, and in the end only shrugged.

He sighed, not in any impatient or discouraged manner, but with the sympathy owed another about to follow the path he'd blazed so many years before. “Here it is. Ken Destry may have been the first person on the Moon to ever completely lose his mind. He lost it for reasons that were not his fault, and that don't reflect on him as a human being, but he lost it just the same. And he didn't lose it while he was sharing a warren with two hundred other trained workers, capable of imposing their sanity on his insanity. He lost it while he was a closed system, isolated inside a moonsuit, sharing nothing with his fellow humanity, not even the same air. He was, in short, *his own Schroedinger's Box*, and he was completely out of touch with reality, including the reality of *where he was*."

He took a deep breath. “And that, young lady, brings us back to the most pressing question regarding his rampage, one that bothered all of us at the time, but which has been almost completely ignored in all the histories written since then. It's a question so obvious that you're going to feel stupid as hell when I point it out to you.

"You see, Destry was running amuck for close to three weeks by the time I met up with him. During that period, everybody knew he was out of control. Everybody knew he was a threat. Everybody knew he needed to be captured and treated, or at worst killed before he did some serious damage. Nobody, working for any of the six governments and four major corporations on the Moon at the time, was about to welcome him into their own facilities, give him a warm bed for the night, patch his suit, supply him, and then send him on his merry way the next morning, with his condition untreated and his violent madness still out of control. It would have been irresponsible to the point of sociopathy.

"So put together everything you know now and ask yourself the obvious question.

"How did he last that long?

"Where the hell was he getting all his air?"

* * * *

It has been seven minutes since Malcolm Bell fired his rail through Ken Destry's head. In that time, he has regarded the corpse from several angles. He has knelt beside it, weeping. He has stood and circled it, as if hoping that another orbit will alter the nature of the crumpled body at his feet. He has rejected the evidence of his eyes and walked away, turning his back on the body, even standing with his arms folded and his booted foot tapping, in a comic parody of the bus station commuter awaiting the belated arrival of the Number Nine. He has imagined the horrific specter of Destry somehow not still dead, and rising zombie-like to attack him from behind; and he has angrily told himself Don't be stupid, *but the madness of the day makes all possibilities equally likely and so he's whirled, certain that he'll find the body either gone or lurching toward him, but circumstances are kind and spare him that insanity, at least. He will never admit to hearing the frantic voices shouting at him over his suit radio, the ones demanding his latest status and assuring him that they are almost there; he will later say that shock kept him from registering the voices, but the truth is that he does not want to speak, that he doesn't trust his own mind to come up with anything coherent or cogent or relevant or even sane. He wants to wait for the*

promised relief to arrive, so he can hand off the body, return to the barracks, and surrender to about a month and a half of sleep.

He doesn't see a buggy appear over the nearest ridge and pull to a stop, two spacesuited figures jumping out and approaching him from behind. They have reason to take care. They do not know whether the figure standing before them is the one they've come to save or the one they've come to save him from. Nor does he know, when he surrenders to a violent shudder visible through the material of his moonsuit, that he almost dies in that moment, as his rescuers twitch too and almost put him down.

But eventually they come close enough to identify him from the markings on his suit, and by then they're close enough to see Destry too. At which point everything changes.

Destry, who's as naked as any man can be, which is naked enough for an environment under atmosphere, infinitely more naked in a vacuum that should have killed him even before he was put down by Malcolm Bell's lucky shot.

It had not been stress or the threat of imminent death, but the sight of Destry exposed to vacuum and still stumbling along the rocks, no worse than drunk, his beard and scraggly hair making him look like a terrestrial hermit disturbed from his cave, that had made Bell's sanity wobble at that last moment before the two men fired upon one another.

Under the circumstances, it's a wonder Bell fired at all. Maybe his finger twitched and he got lucky.

The inevitable autopsy on the unfortunate Destry will find no organic damage other than that traceable to the contaminants in the air supply of the suit he no longer wears, and the much bigger, much more catastrophic wound inflicted by Bell. Nothing about his corpse betrays any sign of even momentary exposure to vacuum: not so much as a single burst blood vessel. Nor has Destry missed any meals. Nobody can identify the contents of his stomach; it's cooked meat, but not of any species anybody can identify. Nor can they identify the soil beneath his fingernails, or the combination of oceanic salts dried on his skin, or the species of mite that has built itself a new home in his matted hair. The insects, if they can be called that, possess no terrestrial DNA.

But that's all confusion for several days from this moment, after those working on the problem have had time to acclimate to the size of this mystery. Right now is another story. Right now Bell and his colleagues are still absorbing the impact.

The first colleague to reach Bell is Connie Aldrin No Relation, those last two words a nigh-permanent part of her last name, on this world where she has come to build a future. She touches faceplate to faceplate, so muffled sound can pass from one helmet to the other without benefit of broadcast, and asks the big question for the first time.

"How did he do it?"

* * * *

By the time Bell was finished, I'd asked for and been given another shot of *druhz*.

Part of me could already feel that his warning had been accurate. What I'd heard had changed me. Wherever I went from here, whatever career I built, whatever relationships I forged, would all lead to me living in a cramped habitat like Bell's, alone, the secret clutched to my breast like a beloved child who needed to be protected. I might not end up here for decades. He hadn't. But this was where I was going, someday, and though I should have been horrified by the realization, I also felt a certain odd kind of

wonder as well, as if the prospect might not be all that bad.

I said, “This is about those aliens you said your people were in contact with. That ... what were their names? Minnie and Earl."

He shook his head. “We still don't know for a fact what Minnie and Earl were, or whether ‘alien’ was a fair label for them ... but yes, they were our first line of inquiry. After all, they had some capabilities echoing those Destry had demonstrated. But it ultimately didn't make sense. After all, they'd never been hostile to us: quite the contrary. They were a welcome and even beloved presence. Lending their talents to a threat like Destry was well out of character for them."

I said, “You don't know what their agenda was."

"No, we don't. Not really. But we knew *them*. They were good neighbors. It may be a little hard to accept if you weren't there, with us, but the hard part wasn't so much believing that they could have given Destry a little technological assistance surviving vacuum, as accepting that Minnie would have had anything whatsoever to do with encouraging him to run around naked.” There was genuine affection in his eyes. “That old girl had some proper ideas. Trust me, I only mentioned Minnie and Earl so you'd know that we were already a little accustomed to unusual conundrums in those days. We always considered their involvement unlikely, and when they confirmed that they didn't have the slightest idea how Destry had done what he'd done, we heaved a communal sigh of relief and looked elsewhere.

"So we next considered the possibility that Destry's brain or body had undergone a spontaneous beneficial mutation, perhaps in reaction to the poisons he'd absorbed. But that didn't work either. None of the colleagues who'd metabolized and recovered from smaller doses exhibited any anomalies at all, and the many experts who looked at the body reported that it was, organically at least, cell by cell the same machine it had always been.

"There have been volumes, all highly classified, written on this stuff, but I'll bring you to the bottom line. Once the brain boys eliminated all the other theories, including one that blamed me personally for somehow setting up the greatest fraud in the history of the space program, we were left us with only one possibility, the one I've already prepared you for: the likelihood that Destry survived vacuum because he was too fried to care that surviving in vacuum was a problem. *Somehow, he was able to breathe because he thought he was able to breathe."*

It had been a while since I'd last blinked. I blinked too many times now by way of compensation and said, “But that makes no sense. He wouldn't be the first crazy person to drown or suffocate. And if it comes to that, crazy doesn't have to enter into belief. You could remove all the oxygen from your air mixture and I'd lose consciousness and die still believing that I was breathing fine."

"True,” said Bell, radiating sheer approval at my gift for spotting the obvious objections. “So there had to be more to it, some special way of believing in the unbelievable. Some way Destry found by accident.

"One of the earliest scientists working on the problem explained it to me this way. Imagine a vault door twenty miles wide. Imagine everything you could possibly want in one great big pile on the other side. Imagine there's only one keyhole. Imagine that while you do have the key, you can only approach the vault blindfolded, from a position that virtually guarantees you cannot find the lock by proceeding in a straight line. Further imagine that you will be given only one try to fit your key into the lock, without scraping the sides ... and that the fit will have to be perfect.

"Pretty long odds, right? But it's worse than that. The keyhole is drilled into that lock at a pretty goddamned strange angle, and will only admit the key if you match that angle precisely. It's not an altitude you're likely to guess. In fact, it's at an angle you're guaranteed not to guess, if you go by prior experience

and rational thinking. Your only real chance is to somehow turn off everything you've ever learned or intuited and just go for a totally random approach—which is damned near impossible, given that everything you do is informed by your personal experience. The only consolation you have is the knowledge that if you do somehow manage to find that keyhole, you will be able to mark it for yourself, so you can later find it at will.

"Along comes Destry. His mind has turned to pudding. He's lost all possible barriers between the real and subjective. He's no longer self-censoring. He's thinking random nonsense, and when he takes a random leap at the wall, he defeats the odds, finds the lock, and succeeds in turning the key, probably without even knowing what a remarkable thing he's just done.

"He might not even be the first. History's full of unlikely stories about crazy people and visionaries performing acts best described as miracles. Some of those stories are bullshit. Maybe even most of them. Or all. We're talking about an unusual phenomenon, and bullshit's a downright common one.

"But given what we know, it's also not that much of a stretch to wonder whether one or two of those crazy sons of bitches did on Earth what Destry, with his own fried brain, managed to accomplish on the Moon. Maybe one or two of those nutbags who made persuasive claims to be prophets or deities were just schizophrenics who, like him, had guessed right. Maybe one or two of them found the key, *the way of thinking*, which allowed consciousness to trump time, distance, conventional physics, life and death.

"And maybe we could too.

"All we knew for a fact was that Destry had.

"If so, the only possible way to claim that gift for humanity was to fund what can only be called an Inner Space program, where people were trained to give up the objective in favor of the subjective. Those Innernauts, for lack of a better phrase, had to lock themselves up someplace without other distracting influences, without other people around to tell them they were being stupid, and *think*. With no guarantee of success, and no advantage except the knowledge that a crazy person found that keyhole before them.

"All you really need, he said, “is a regular supply of people who won't mind giving up the end of their lives to become Schroedinger Cats.

"Now think.

"Who the hell else are you gonna find to do such a job, except for people who have already spent their lives locked up in tin cans in order to explore the universe? And how are you going to get even them to do it until they're so old that it's the last form of exploration they have left?

"I can only tell you this. It took twenty years of nonstop concentration before one of us found the way. Another five before he managed to impart what he knew to another. Another five before the number of people reaching the threshold exceeded one per year. Five after that, and some of us were zipping back and forth on a whim. None of us are yet at the stage where we can do it consistently, which is why I always wear a moonsuit if I step out my airlock door. And we're still debating safe ways of introducing what we know to humanity at large. But I can say this. Just because I rarely use that airlock ... it doesn't mean that I never *leave*. Via space *or* time."

What followed was not complete silence. The habitat still hummed from the operation of the systems that made life here possible for creatures like myself still handicapped by insufficient skill at dealing with the impossible.

He stood and said, “You'll always be welcome here, Jessie James. I like you, and as long as I still need

to come back here on a regular basis this old homestead will be a much more accommodating place if it saw regular visits from a lady as bright and as charming as yourself. But you're still young—way too young to waste years sitting on your ass trying to find your way to the same path I've found. So, no, I'm afraid I'm never going to give you any lessons. When the time comes, if it's what you want, you're going to have to find your own way.

"But I do see potential in you.

"And I do think you've earned one free ride.

"There are people I want you to meet."

He extended his hand.

After a moment, I took it.

* * * *

Many years later—I won't say how many—the Lunar Authority announced Malcolm Bell's death. They said that he'd been cremated, as per his own instructions, and scattered throughout the solar system, with some of him added to the atmosphere of soil of each of worlds where humanity had established a foothold. Supposedly a final portion was placed aboard one of the unmanned probes we were still firing into the outer dark, a gesture that allowed commentators the easy observation that he belonged to the stars now. It had been so many years since the gunfight, by then, that the most common reaction was surprise that he'd still been alive at all.

Most of the articles said that he'd been living quietly in his Farside habitat, thinking thoughts that could only be known to him. They said he'd cut himself off from all human contact, save for occasional visits from his physician and from a now middle-aged woman named Jessie James, who his will described as a personal assistant. He left sufficient funds for the maintenance of his habitat, which would be held in trust until the day she could move in herself, at some point in her late old age.

As Bell said that first day, bullshit remains a constant in the universe.

If Bell really died that day, if he was really cremated, the visitors who show up at my front door from time to time wouldn't be asking about his whereabouts, or the means he'd used to travel there. They wouldn't ask, every time, whether I'd seen him or whether he and his fellow travelers had ever sent back any useful information. For what it's worth, I did see Malcolm Bell at least four more times after his supposed cremation, and hope to see him again, though like him I respect the path the luckless Ken Destry forged and won't share it with anybody who thinks it can or should be learned by simply asking.

All I know is that when the news hit the media, I was doing a routine audit of a certain lunar amusement park, on premises. I immediately announced that I was taking the rest of the day off, put the books away, and began to wander throughout the grounds, passing the laughing children and thundering coasters and the concessions selling the usual variety of food designed to rot your teeth and expand your waistline.

I didn't know what I felt. Not grief, certainly. I'd expected this news for some time. And not inevitability. I had a husband and a daughter and friends and a career, and though there were still years to go before I'd have to make up my mind for sure, I was still telling myself, in those days, that I wouldn't ever follow where Malcolm Bell had led. But then why did I keep thinking about it?

I was still wondering by the time I found myself sitting on a park bench opposite the habitat the park had built for its two cloned polar bears. They were popular attractions, and they were more than earning their keep today, with a show of ursine exuberance that amounted to hours spent repeatedly climbing to their

habitat's highest point and launching themselves into the open air only to splash down into their lagoon. Each belly flop was like a thunderclap, each splash an explosion. I wasn't the only park visitor so delighted that I parked myself at a good vantage point and watched, happy just to witness the simple animal joy they took in being alive.

After a while, though, I focused on the habitat itself. Spacious enough to house the two bears in comfort, it was still not quite as voluminous as it was designed to look. The park had used various design tricks involving light and false perspective to make it look about half again as large. It evoked, without coming close to duplicating, the vast expanses of the Arctic these creatures had evolved to inhabit, a place that no longer existed and that would now kill them as surely as the vacuum outside the dome we used to house ourselves.

The least of the tricks was a mural painted on the crescent-shaped rear wall of the habitat, depicting ice floes and stark blue skies and aurorae and the distant forms of migrating seals. It was a marvelous work of art, that mural; the sculpted stones of the bear habitat seemed to melt into it without quite betraying the place where a false but tangible habitat merged with the backdrop one step further removed from reality.

The mural was meant for the pleasure of humans, not bears. No doubt the bears couldn't process its images in terms easily translated to the past of their moribund species. But as I sat there, in the warmth of the simulated spring day, I found myself wondering if the bears ever did register the natural home promised by that two-dimensional presentation, and if so whether they could ever be fooled by it; if they ever stared at the nonexistent seals nonexistent kilometers away, found the wall between them and that distant smorgasbord, and puzzled over how to get from here to there. Did they ever think it might be as simple as finding the right angle of approach? As rushing the wall with the right attitude?

Of course not.

They were bears, not philosophers.

But was it possible that it was only this very limitation that made them fail? That a polar bear with the twin gifts of imagination and the way of thinking poor Ken Destry had needed his madness to find, could believe itself past that mural into a place a polar bear would consider home?

It was possible for people. I knew it because I'd seen it. I'd been there.

The only question was whether I could dedicate myself to making the journey.

I won't pretend that I made up my mind that day. I didn't move into Malcolm Bell's old habitat for another thirty years, and I suffered more than my share of doubt and wavering resolve before then. I can only say that I still consider that day a tipping point.

The other worth talking about took place on the day we met, when he asked me to take his hand.

There was a world. It was not a bad world. The trees didn't look like trees and the mountains didn't resemble mountains and the sky certainly looked like no sky I'd ever seen, but it was all beautiful and benign, and there was something about the air that energized my lungs and made every ounce of me feel alive. There was a lake, with water pink and subtly perfumed but apparently safe for human consumption, as there were children splashing around it, their play shared by sleek big-eyed things that would remind me of seals if seals had opposable thumbs. A small semicircle of cottages surrounded a beach on one shore, each small, each unpretentious, each flying the flag of the Lunar Authority and in some cases the flag of one of Earth's antique countries as well.

On the day Malcolm Bell and I strolled down from the hills, not all of those cottages were occupied. The

residents were traveling elsewhere. But this was home base, of sorts, and at least twenty people ranging from infancy to late middle age were in sight, recognizing Malcolm Bell and waving at him from the comfort of their respective front porches.

I looked at Bell, who seemed to have dropped thirty years since we left his habitat. His features were still lined and his hair still white, but his eyes were vibrant and filled with something I recognized as love for his neighbors. All of a sudden I felt shy, but I still managed to ask a question. “Are these all Farside hermits?"

Bell laughed out loud. “Most of them. Some found their way on their own. And a couple of others, like this one"—he said, as a figure from one of the nearer cottages hopped off his front porch to greet us—"we brought here because we figured they deserved it."

The man walking toward us had one of the most heroic, bushy moustaches I've ever seen. His gait and his outstretched hand seemed friendly enough, but the warm welcome he conveyed didn't come anywhere near his eyes. From what Bell told me later, it never did.

Bell's earlier words, *space or time,* his later reference to consciousness trumping *life and death,* hit me again, and I went a little weak in the knees. Extending my hand, I managed a weak, “H-hello. I'm Jessie James."

The stranger looked like he would like to laugh, but couldn't. If he was who I thought he was, he was incapable of it. It was just not in his emotional repertoire. “Really?"

Bell was having the time of his life. “No joke. It really is her name."

The man with the walrus moustache took my hand.

By this time I was more certain than ever that this stranger was about to say he was Wyatt Earp. The real Wyatt Earp, plucked from time and history and even his own death to live a limitless future in the stars. Given what I'd been told that day and the other puzzle pieces I'd be putting together for years to come, it was certainly within the realm of possibility, if only because I wanted it to be and Bell knew how to turn *want* into *have*.

But that's not who this man was.

You see, Malcolm Bell might have become as famous as Wyatt Earp, and the canonization of his name might have echoed much of what happened to Wyatt Earp, but as a man he owed Wyatt Earp nothing. He had other debts to pay.

And I learned what debts when the man with the walrus moustache said, “Pleased to meet you, ma'am. I'm Ken Destry."

This one's for Mitch Silverman, who insisted.

* * * *

(EDITOR'S NOTE: Minnie and Earl, mentioned briefly in this story, earlier took center stage in “Sunday Night Yams at Minnie and Earl's” [June 2001].)

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[Back to Table of Contents]

Science Fact: **RIBBONLAND** by Kevin Walsh

Are there worlds somewhere out there in the galaxy that have eternal spring mornings and endless summer days? The prime candidates are ribbon worlds, planets that always keep the same face towards the star that they revolve around. This means that their periods of rotation on their axes are the same as their periods of revolution about their stars. The sun-facing side is impossibly hot, the dark-facing side incredibly cold, and in between is a narrow band of more tolerable temperatures, winding like a ribbon around the entire planet.

Such worlds are probably common in the galaxy. They are most likely to occur in systems with small stars, because such stars are more likely to have planets forming close to them where they experience strong gravitational forces, similar to the tides that the Moon and the Sun exert on the Earth but much larger. These tidal forces can slowly stretch and strain the crust of a planet over the eons, thus dissipating much of its rotational energy, slowing it down until it finally becomes a ribbon world.

In the days before space exploration, it was believed that Mercury was a ribbon world. But in 1965, radar observations showed that Mercury did not keep the same face towards the Sun all the time, so sunrises and sunsets do occur on all parts of the planet except deeply shadowed polar craters. Despite this, there is actually a strong relationship between the rotation and revolution periods of Mercury: it rotates three times for every two times it orbits the Sun. This is not coincidence, as studies of orbital dynamics suggest that Mercury's oval-shaped orbit could cause a 3:2 ratio to occur as one possible outcome of strong tidal forces.

This ratio was the reason why early observers believed that Mercury was a ribbon world. Mercury's rotation rate is 58.6 days, which is just about half the time between successive closest approaches of Mercury to Earth, the so-called synodic period. Now Mercury is close to the Sun and is easily lost in the solar glare; its effective observation period from our planet is limited to those parts of Mercury's orbit when it is furthest away from a line joining the Earth to the Sun. Obviously, this occurs twice every synodic period and is known as a maximum elongation. During one of these maximum elongations, Mercury is on one side of this line, in the northern half of our sky, and during the other it is on the other side of the line, in the southern half of the sky. So Northern Hemisphere astronomers naturally chose to observe Mercury only when it was in the northern sky. Thus the fact that the synodic period is close to twice the rotation rate meant that during the effective observation period astronomers always saw the same part of the planet. Therefore these observations strongly suggested a 1:1 ratio between rotation and orbital periods, so pre-1965 astronomers can hardly be blamed for assuming that Mercury was a ribbon world.

There are no such worlds in our solar system. But three planets have been recently found circling the small, nearby red-white star Gl 581, and at least one of them may be a ribbon world.

* * * *

Endless Spring

While no ribbon worlds have yet been identified with certainty, they have been a part of speculative fiction for some time. For instance, some of the action in Isaac Asimov's *Foundation* series takes place on the ribbon world Radole, where the capital is said to bask in the “eternal morning of an eternal June,” while only thirty kilometers away liquid oxygen flowed like water. Based on our knowledge of climate science, this is impossible. A substantial atmosphere of the kind that would be certain to exist on a habitable world is able to transport large amounts of heat, so an imbalance of temperature of this magnitude over such a short distance would be swiftly corrected by the movement of warm and cold air, along with accompanying storms. Other fictional ribbon worlds include Harlan Ellison's Medeaand, more

recently, Aurelia on the National Geographic TV special *Extraterrestrial*.

Ribbon worlds have also been constructed in numerical form, as a way of determining their weather and climate. Numerical simulation of the weather and climate of the Earth has become routine, but it is only relatively recently that it has been attempted for extrasolar planetary environments. These simulations are now being used to make inferences regarding the habitability or otherwise of worlds outside the solar system, including ribbon worlds.

Ribbon worlds have often been assumed by planetary scientists to be essentially uninhabitable, due to serious questions regarding the stability of their climates. Would the dayside temperatures become so hot that the oceans in these regions would start to boil away? This would be fatal to the habitability of such a world, as the evaporation of significant fractions of an ocean would place large amounts of water vapor into the atmosphere, thus strongly increasing the greenhouse effect and leading to a vicious warming cycle ending in a so-called “runaway greenhouse.” Would the night side temperatures be so cold that the atmosphere would start to freeze out on the surface? This would also cause a serious problem, as eventually it would lead to the condensation of most of the atmosphere and to the end of habitable conditions on the planet.

But in the past ten years, numerical climate simulations have challenged these ideas. Manoj Joshi of the University of Reading has used such simulations to investigate the climate of ribbon worlds. Since this type of planet is most likely to occur around a small star, he assumed that the ribbon planet circled a star with 20% of the mass of the Sun and only 1% of its total brightness. For simplicity, he also assumed that the planet received exactly the same amount of radiation as the Earth receives, and so therefore it would need to orbit its small star much closer than the Earth orbits the Sun, at only one-tenth of the distance. He found that for a planet entirely covered by oceans, the hottest part of the planet, where the star is directly overhead (known as the sub-stellar point), reaches an average temperature of only a little over 30oC (about 85oF).

This surprising result is due to the simulated temperatures being kept under control by the very strong effect of cooling caused by evaporation of water from the ocean surface. These hot, humid conditions are accompanied by torrential rainfall, with amounts greater than the wettest places on Earth. At the coldest place on the planet, in the center of the dark side, average temperatures are about -30oC (-22oF), or about as cold as an Arctic winter and warmer than typical winter temperatures on the Antarctic plateau.

The best climate on the planet is found in the narrow ribbon area, in this case a strip of the surface located somewhat sunward of the terminator, the line separating the sunlit side from the dark side. This region of the planet experiences a tolerable climate with pleasant temperatures between 15 and 25oC (59 and 77oF), accompanied by reasonable rainfall amounts. Let's call this optimally habitable area “Ribbonland."

Despite its spring-like climate, the day-to-day weather of Ribbonland would be less than idyllic: the horizontal temperature gradients are quite steep and on Earth this usually implies changeable, stormy weather. Certainly these regions are windy, as the planetary atmosphere is heated strongly on the sunlit side and therefore rises rapidly, like a hot air balloon. This would force air to flow in from the sides to replace the rising gases, causing persistent, strong winds to blow along the surface from the dark side to the sunny side.

A similar wind occurs on Earth: it is called the monsoon and it arises from the strong heating of the Asian continent during summer, drawing in warm, moist air from the tropical Indian Ocean. As the air travels over land, clouds form and the resulting monsoon rains bring life back to the parched landscape. If this monsoonal air is pushed up over mountains, rain clouds are generated more rapidly due to stronger cooling. Such mountainous monsoonal regions are among the rainiest places on Earth: Cherrapunji in

India receives a June average precipitation of 107 inches, more than double what New York City receives in an average year.

The terrestrial monsoon is a persistent wind, but nothing like the Ribbonland monsoon. Typical simulated average monsoon wind speeds in Ribbonland are around 10-15 ms-1, or about 20-30 knots, comparable to or larger than the average wind speed over the windiest sea-level regions on Earth, including even the monstrous seas of the roaring forties and furious fifties around Kerguelen Island in the south Indian Ocean. On Earth, this average wind speed would be enough to set large branches on trees in motion and would be noticeably difficult to walk against. And that's just on an average day. So Ribbonland would be a stormy, windy place with big day-to-day changes in temperature.

Now let's see what happens when some land is placed on the surface of the ribbon planet. If land is present at the sub-stellar point, average temperatures in this region exceed 70oC (158oF), making it uninhabitable by human beings. In regions of Ribbonland that are largely dry land, horizontal temperature gradients would therefore become extreme, larger than anything experienced on Earth, with corresponding effects on the weather. Ribbonland would alternately bake or freeze depending on which direction the wind blew—not a nice place to live. So it is clear that Ribbonland would be optimally habitable if it were predominantly ocean and dotted with a few reasonable-sized islands. If these islands were mountainous and faced the monsoon, rainfall over them would be torrential. Alternatively, a reasonably habitable climate could be achieved if the sunlit hemisphere were entirely ocean while Ribbonland and the dark hemisphere were largely land. In that case, though, Ribbonland would be mostly desert, as the monsoon would then be blowing from the dry, cool land regions of the dark side.

The implication of this and other work is that the climate of ribbon worlds is not necessarily as extreme as we once thought, so they can be hospitable places for life. They are most likely to orbit red-white M-class stars, the smallest and most numerous stellar classification, comprising more than 70% of all known stars. The star Gl 581 is an M-star, and its recently discovered planets, in addition to being possible ribbon worlds, are also possible candidates for life.

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Super-Earths

The star Gl 581 is quite close, only about 6.3 parsecs away in the constellation Libra, in pretty much the same direction as the much more distant blue star Beta Librae, also known as Zubeneschamali. Gl 581 has some strange near neighbors. While the closest object to it is the apparently unremarkable M-star Gl 555, less than 4 parsecs away from Gl 581 is the variable star Xi Bootis A. This star is evidently not satisfied with one kind of variability, as it has two. It is a BY Draconis type variable, a star that brightens and dims by about 50% over a period of about ten days due to the presence of large star spots. It is also a UV Ceti type flare star, indulging in irregular minor explosions, much like the flares of our own Sun but considerably bigger. In this regard Xi Bootis A is unusual, as it is about half the luminosity of the Sun and so is more massive than most flare stars. The star is part of a binary system: roughly 30 AU[1] away on average is the smaller orange-white star Xi Bootis B. In addition, the system is listed in the CCDM double star catalogue as having four stars, but in the Gliese catalog of nearby stars there are only two, so we may assume that the other two just happen to be visible in the same line of sight and are actually much further away.

[FOOTNOTE 1: An astronomical unit (AU) is the average distance from the Earth to the Sun]

A genuine multiple star system is located less than 3 parsecs away from Gl 581, the triple system GL 644. In this system, two average-sized M stars orbit each other with a period of 1.7 years, which means that they are on average about 1 AU apart. In the same system, about 1,000 AU away, is a very dim M-star, over 100,000 times less bright at visible wavelengths than the Sun. This seems tiny until you

realize that such objects far outnumber stars like the Sun and that they are in turn likely to be considerably less numerous than even dimmer objects that have yet to be detected. This star also has periodic flare-ups, like so many smaller M-stars. Also known as VB8, it had a brief claim to fame some twenty years ago when a brown dwarf was reportedly discovered orbiting around it, one of the first to be found. A brown dwarf is an object that is too small to undergo fusion of hydrogen within its core, but nevertheless emits considerable radiation from various processes, including slow contraction. Unfortunately, this detection proved false, and no smaller objects are known to orbit VB8 at this time.

The most unusual system in the neighborhood is probably that of Gl 570, with four known components. Gl 570A is another BY Draconis type white-orange star. About 190 AU away from it are Gl 570B and Gl 570C, a pair of red-white M-stars separated by only about 0.8 AU. But about 1,500 AU distant is Gl 570D, a T-type brown dwarf only about fifty times the mass of Jupiter. This is a star that never quite made it. It has one of the lowest temperatures of any known brown dwarf, at only 500oC (900oF), compared with 2,500oC or so for a typical M-star. M-stars are often themselves described as appearing red, but close up they would certainly be bright enough to appear mostly white, just as the Sun, officially designated as a so-called “yellow” G-star, in reality appears a kind of very bright white-yellow. Not so T-dwarfs: Gl 570D is actually cool enough to glow dull red, like the embers of a dying fire. Moreover, once our observational techniques improve, we will find a great many more brown dwarfs; our understanding of stellar formation suggests that there are likely to be as many of them as there are regular stars.

Gl 581 itself is over two hundred times less luminous than the Sun at visible wavelengths and has a total radiation output at all wavelengths only 0.013 times that of the Sun. Unusually for an M-star, the brightness of Gl 581 does not vary much, which implies that it is at least several billion years old, as models of stellar evolution and observations both indicate that M-stars are much more variable when they are young and can take a billion years or more to settle into a more typical pattern of behavior. Some statistics of its known planets are given in the table below. Their orbital parameters are not established with full confidence, as the deduced values are the ones that fit best the observed pattern of the detected movements of the star, caused by the planets tugging on the star as they circle in their orbits. The biggest planet in the system, Gl 581b, has a mass about the same as that of Uranus or Neptune. GL581 has a lower percentage of heavy elements than does the Sun, and this, combined with its low mass, suggests that the formation of large, Jupiter-sized planets in this system would have been unlikely, so they probably do not exist.

A quick check on the potential habitability of the planets can be made by comparing the amount of radiation that they receive from their star to that received by various planets of our solar system. This shows that both Gl 581b and Gl 581c receive way too much radiation. The cooler of the two, Gl 581c, gets about 30% more total radiation at all wavelengths than that received by Venus. It is hard to envisage under what scenario this planet could remain habitable. Venus was victim of a runaway greenhouse effect a long time ago. Since Gl 581c is larger than Venus, it is likely that its original atmosphere was more massive also, giving even more potential for greenhouse warming. So we can safely scratch Gl 581b and Gl 581c from the habitability list. If Gl 581c started out with lots of water, it could now have a very hot steamy atmosphere with a temperature greater than 700K, a so-called “steam ocean” with no real boundary between the atmosphere and the ocean, rather like the one that exists on Neptune. Alternatively, if it started out with less water, it could have lost it and so would have ended up like Venus is today.

Gl 581d is a different story. It receives only about 20% of the total radiation received by Earth, less than does Mars, but this turns out to be less of a problem than receiving too much. Once again, the key is the magnitude of the greenhouse effect. If the atmosphere of the planet contains a lot of greenhouse gases like carbon dioxide, perhaps several times as much as all of the gases in Earth's atmosphere combined,

then surface temperatures could be kept above the freezing point of water, at least on part of the planet. In that case, the optimally habitable Ribbonland would not be located near the terminator but near the sub-stellar point, where temperatures would be warm enough.

Of course, such a planet would not really be habitable by human beings. Even if it hosted organisms that were producing oxygen in large quantities, the atmosphere would still be toxic, as the high concentration of carbon dioxide necessary to keep the planet warm enough would be harmful to breathe. Also, estimates suggest that the surface gravity of Gl 581d is approaching twice that of the Earth, far too much for sustained human habitation, although not too much for land plants or for organisms living in the ocean. Oceanic organisms would be neutrally buoyant and thus protected to a large degree from the damage that could be caused by high gravity. Even so, the planet may not have sufficient greenhouse gases to maintain liquid oceans, in which case it would be a giant, frozen wasteland, with no Ribbonland at all.

Also, for Ribbonland to exist, Gl 581d would need to be in synchronous rotation, the technical term for always keeping the same face towards its star. If its orbit is slightly oval-shaped, as the analysis suggests, then just like Mercury it could have non-synchronous rotation. If it had a 3:2 ratio of rotation to orbital period, like Mercury, then it would have a rotation period of 55.7 days and a "solar day," the time between sunrise and sunset, of 177 days—again, by strange coincidence, almost exactly like Mercury. This would also mean that there would be no Ribbonland, as there would be sunrises and sunsets and extreme temperature variations from day to night as the Sun crawled across the sky. In this scenario, a completely oceanic world would have smaller daily temperature variations than a planet with large continents, but even on an ocean world nighttime temperatures at equatorial locations on Gl 581d would still likely be well below freezing unless the atmosphere itself were massive enough to prevent large daily variations in temperature. This is what happens on Venus, where despite its slow rotation its thick atmosphere transports heat so effectively that the surface temperature is about the same on the night side as it is in the day side. But a massive atmosphere also means crushing surface pressure, another factor that would limit habitability.

So, overall, the planets of Gl 581 are not prime locations in the search for extraterrestrial life. But M-stars in general might be.

* * * *

Data for the planets of Gl 581 (adapted from Udry et al. 2007)

Mass (in Earth masses) [**Gl 581b**: 15.6] [**Gl 581c**: 5.06] [**Gl 581d**: 8.3]
Distance from primary (in AU) [**Gl 581b**: 0.041] [**Gl 581c**: 0.073] [**Gl 581d**: 0.25]
Orbital period (in days) [**Gl 581b**: 5.3] [1**Gl 581c**: 2.9] [**Gl 581d**: 83.6]
Eccentricity of orbit [**Gl 581b**: 0.02] [**Gl 581c**: 0.16] [**Gl 581d**: 0.2]

Larger values of eccentricity imply that the orbit is more oval-shaped

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M-stars eternal

Another important issue for habitability is that many M-stars are also flare stars. It has been shown that the typical amount of ultraviolet radiation received during one of these flares by a planet at a habitable distance from an M-star can be temporarily as much as ten times the ultraviolet radiation routinely received by the Earth. This may be a particular issue for the early development of a habitable planet around an M-star. Calculations have shown that large flares from a young M-star could entirely remove the atmosphere of a planet at the close distance required for a planet to be habitable. If the planetary atmosphere survives this trauma, though, the solar radiation output of the star is likely to stay the same for a very long period of time, as M-stars then enter a long period of remarkable stability, with energy output

changing little over many billions of years, apart from the occasional flare.

But flares can have positive impacts also. Studies have suggested that the usual reddish light of an M-star may not be energetic enough to support photosynthesis. The flares of M-stars may thus supply some badly needed energetic radiation for any life that occurs on planets around them, enabling periodic growth spurts to occur. This is not a new idea: Larry Niven's short story “Flare Time,” part of the Medea volume, has given us a vivid depiction of such an episode. Of course, this assumes that such life-bearing planets around M-stars have been able to develop a protective ozone layer, or that its organisms have found ways to adapt themselves to higher levels of ultraviolet radiation.

M-stars have another advantage in the search for life in the universe. Because M-stars are small, Earth-sized planets are more easily detected in orbit around them than they would be around a bigger star like the Sun. This is because Earth-sized planets can give larger tugs on small M-stars than on big stars, thus making stellar movements easier to detect. This is the method that has been used to detect most extrasolar planets, but other methods that have been employed to date also work better for planets orbiting M-stars. With current techniques, routine detection of planets as small as two Earth masses is possible around M-stars, and even smaller planets can be found under certain conditions. So the first genuine Earth-size, Earth-type planet might well be discovered orbiting an M-star rather than a Sun-like star.

This means that Ribbonland might be discovered sooner rather than later. In fact, because there are many M-stars, Ribbonland may not only exist, it might be quite common. It might not be basking in an endless Arcadian springtime, but the real Ribbonland, windy, stormy and subject to solar flares, might be more than just a strange anomaly among habitable planets: it might be the rule rather than the exception, and Earth might be the anomaly. And M-stars are long-lived. Long after the Sun has ballooned into a red giant, vaporizing all life on Earth, Ribbonland will still be out there, huddling close its small star, its lifeforms scraping by until the next flare, billions of years after Earth has become a cinder.

* * * *

Acknowledgments: The author would like to thank Simbad (simbad.u-strasbg.fr/ simbad/), *the Extrasolar Planet Encyclopedia (exoplanet.eu) and the nice compilation of information about nearby stars contained at www.solstation.com.*

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Further Reading

Joshi, M. (2003) “Climate model studies of synchronously rotating planets.” *Astrobiology*, 3, 415-427.

Scalo, J. et al. (2007) “M stars as targets for terrestrial exoplanet searches and biosignature detection.” *Astrobiology*, 7, 85-166.

Selsis, F. et al. (2007) “Habitable planets around the star Gliese 581?” *Astronomy and Astrophysics*. 476, 1373-1387.

Udry, S. et al. (2007): “The HARPS search for southern extrasolar planets. XI. A habitable super-Earth (5 Earth masses) in a 3-planet system.” *Astronomy and Astrophysics*, 469, 43.

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About the author

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interests in climate change, climate variability, and planetary science.

[Back to Table of Contents]

Short Story: **THE FINAL ELEMENT** by Eric James Stone

Some future crimes will not involve “taking away"....

Waving off the uniformed policeman's offer to help, Dennis Lombardo ducked under the yellow crime-scene tape and hefted the case containing the nuclear resonance scanner over the threshold of the New York brownstone. Slivers of wood from the broken door littered the floor.

"I've lugged this thing all the way from L.A.,” Dennis said to the officer. “I can manage. Just lead the way to where you want me to set up my equipment."

The officer escorted him to a room dominated by a grand piano. Glass and wood cabinets displaying musical instruments and books lined the walls. At the back of the room, though, stood the thing that had brought him here: the brushed-steel, five-foot cube of a Series 3 nanofactory.

Next to it, on a white-linened table, lay two violins.

Setting down the scanner, Dennis walked over and studied the violins. They were made of fine-grain wood covered with a red lacquer, and to his eye they appeared identical in every respect, except for the NYPD identifying tags. That was to be expected—he would not have been sent here otherwise.

"My most prized possession,” said a voice from the door. “At least, one of them is."

Dennis turned to see the silver-haired gentleman who had entered the room. “I'm Dennis Lombardo. NanoFaction sent me to detect the fake."

"Anton Gale.” The man reached out and shook Dennis's hand. “Terence Zhang is an old friend."

Until last night's phone call ordering him to fly overnight to New York on the corporate jet, Dennis had never spoken to Zhang, NanoFaction's CEO. Gale obviously had connections. “Our company is always happy to help where we can."

"So what do you think of the Soil?” said Gale.

"Excuse me?"

"The Soil Stradivarius."

Dennis looked over at the violins. “Oh, this is a Stradivarius? I've heard of those."

"You are not a violin expert?"

"I'm sorry. I'm familiar with scientific instruments, not musical ones."

"Ah, of course,” Gale said. “Allow me to introduce you to the instrument of Yehudi Menuhin, Itzhak Perlman, and Yuri Volokh."

The names sounded familiar, so Dennis decided they must be famous violinists. “Very impressive. I guess that's why someone would steal it and try to dupe it."

"Not just someone. Leonard Wharton, another collector. This is his house,” Gale said. “You must understand, the Soil Strad is considered the finest violin in the world. I paid fifty-five million at Sotheby's to own it, back in 2027. And the man I outbid was Wharton."

Dennis raised his eyebrows. “And he stole it from you?"

"Apparently, he planned to ransom the fake and keep the real one for himself. He has been arrested for using an unlicensed nanofactory pattern." Gale waved a hand dismissively. "I do not wish to press charges against him for the theft, for I understand his obsession. But the police cannot determine which violin is mine and which is the unlicensed copy they need to keep as evidence."

Dennis nodded. In order to minimize economic disruption, the government had prohibited nanoduplication of unlicensed patterns. The copy would have to be destroyed when the police were done with it. "Let me just set up my equipment, and I should be able to determine fairly quickly."

"Your equipment will not damage the violin, I hope."

Dennis opened up the case and removed a thick-legged tripod. "Nuclear resonance scanning is safe enough you could use it on a baby. I'm not sure why you'd want an atomic map of a baby, but if you needed one..."

He set up the tripod next to the table with the violins, removed the scanner from the case, and attached it to the tripod. Pointing the nose of the scanner at the first violin, he did a five-second preliminary scan for solid objects in the field, then selected the violin. After shrinking the selected volume slightly in order to ignore any surface contamination, he initiated a thorough scan.

"Now we wait," said Dennis.

"How long?"

"For something this volume, a couple of minutes. And then I should be able to tell you which is the original."

Gale frowned. "So simple?"

"Yep."

"I thought your nanofactories built things at the atomic level."

"They do. Atom by atom, molecule by molecule. And all atoms are equal." Dennis grinned. "But some are more equal than others."

"You've lost me, I'm afraid."

"A little nuclear scanner humor. Atoms of the same element always have the same number of protons in their nucleus. But they can have different numbers of neutrons. The variations are called isotopes, and my scanner here can tell the difference between different isotopes."

"But even if the ... isotopes of atoms are different between the two violins, how does that show which is my Strad?"

"Some isotopes are much more common than others. Most oxygen atoms, for example, have eight neutrons. Less than one percent have nine or ten. Every nanofactory is programmed to create an isotope 'signature' in the items it creates, by varying the levels of different isotopes."

"I see. By comparing the scans of the two violins, the signature will become apparent."

"I should be able to tell just from scanning one—if it has the signature, it's the fake; if not, it's your Strad."

"Amazing."

"That's my job."

"You do this all the time?"

"Oh, it's not usually so glamorous as detecting forged violins. Generally it's just scanning things to create new patterns for the—"

The scanner beeped.

"—nanofactories. Sounds like the scan's done." Dennis checked the readout. A signature pattern would stand out clearly, but the isotope distributions were within the normal range for natural variation. "This one should be your original. I'll scan the other and show you the signature. After that, the cops can come take it as evidence."

Dennis set up the scan on the second violin.

"It seems such a shame," said Gale.

"What?"

"People have been trying for centuries to create violins as fine as Antonio Stradivari's. Scientists have studied the wood, the design, the lacquer—every aspect of these violins, looking for the Stradivarius secret. And they have always failed, until now. But the law requires that the copy be destroyed."

Dennis shrugged. "Law's there for a reason. What would your fifty-five million dollar violin be worth if anyone could buy one from Wal-Mart?"

"What is the worth of every violinist being able to play on so fine an instrument?" Gale sighed. "But you are right. The law prevents economic chaos."

After a few moments of silence, Dennis said, "The secret still remains. Making a nano-duplicate doesn't explain why a Stradivarius sounds the way it does."

With a smile, Gale said, "Some believe that a violin becomes better if it is loved and played well. The secret is the great violinists who have loved and played their Strads. And that is something your scanner cannot detect, am I right?"

"You are." Dennis chuckled. "Although I suppose we could test that theory. Since the copy violin has not been loved and played well, it should not sound as good."

The scanner beeped. Dennis looked at the readout. There was no signature pattern. As far as his scanner was concerned, both violins were originals. He frowned at the readout. Had he somehow failed to change targets?

"Is there a problem?"

"Yes. I didn't find a signature. So we're back to not knowing which is your Strad."

"How is that possible?"

"It shouldn't be." Dennis stepped over to the nanofactory and frowned at it. "Creating an unlicensed pattern is difficult enough, but eliminating the signature would require reprogramming the nanofactory, and that means our source code security has been compromised. The guy who stole your violin isn't a computer genius, by any chance?"

Gale winced. “No, he's a real estate developer."

"So he must have hired someone to do the hacking for him.” Dennis pulled out his phone. “I have to call my boss."

After a brief conversation outlining the security issue, Dennis hung up.

"What did your boss say?” asked Gale.

"She said I'd better find a way to detect the dupe.” Dennis let out a long breath through pursed lips.

"We could do as you said—play the violins and see if one sounds different."

Dennis doubted that atomically identical violins would have different sounds, but allowing Gale to try the experiment wouldn't hurt—and it would give Dennis time to think. “Go ahead."

After getting a bow from a cabinet, Gale picked up the first violin and positioned it under his chin. He played a few seemingly random notes while adjusting the knobs on the violin. “Tuning up,” he said.

Dennis nodded. He began speculating about possible differences between a real item and a nanoduplicate.

Then Gale began to play. He began slowly, building a melody with the pure tones of the violin. The music floated up the scales, then down again.

Dennis watched as Gale lovingly drew the bow across the strings, sometimes drawing a note out, other times jumping quickly from one note to another.

As the final note faded, Dennis applauded. “Wonderful. Do you give a lot of concerts?"

Gale raised an eyebrow. “Me? No, I am but a practiced amateur. I occasionally loan my violin to truly talented musicians, but...” He lowered the violin and stared at it. “This sounds like my violin. I could tell no difference."

"Try the other one."

After carefully laying down the one, Gale picked up the other.

As Gale played, Dennis concentrated on the music, hoping to hear an extra quality or a missing one, to distinguish the violins. But to his ear the music was just as beautiful as before.

Lowering the bow, Gale said, “They are the same."

"I was afraid of that.” Dennis pursed his lips. “Maybe carbon-14."

"Carbon-14?"

"We use only stable isotopes for signatures. Carbon-14 decays. How old is this violin?"

"It was made in 1714."

"So the wood's over three hundred years old."

"Possibly much more, as Stradivari may have used aged wood."

"If I focus the scanner on an interior piece of wood, I should get a sample mostly unaffected by any later

modifications.” Dennis adjusted the scanner and started it.

"I don't mean to disturb,” said Gale, “but I am curious what you are doing."

"No problem. About one in a thousand carbon atoms in the air are carbon-14. After something is dead, though, it no longer takes in new carbon atoms. After three-hundred-some-odd years,” Dennis said, checking some numbers on the scanner's computer, “about four percent of the carbon-14 should have decayed into nitrogen. Carbon for nanofactory production generally comes from organic waste, but the carbon-14 levels would reflect things that died recently, not centuries ago."

"So there should be more carbon-14 in the fake."

"Exactly."

The scanner beeped. Dennis set it to scan the equivalent portion on the second violin.

Neither of them spoke as they waited for the scan to finish. When the scanner beeped, Dennis tapped a few keys to bring up a chart comparing the carbon-14 counts.

There was not even a millionth of a percent difference.

Dennis scratched the back of his neck. “Whoever programmed the forgery must have made it duplicate the carbon-14 count. Probably did the same with every isotope of every element. The two violins are the same in every physical way we can measure."

Gale wrung his hands. “But one of them was played by Menuhin, by Perlman. And one has never been played, except by me. One was fashioned by careful human hand, the other by uncaring machines. There must be a difference."

"I don't see...” Dennis paused. “There is one element we haven't taken into account yet."

"Which?"

"The human element. Can you have the police bring what's-his-name here? The collector who stole your violin?” A man as rich as Gale must have some pull with the local police.

"Wharton? I suppose so."

"And whoever put these police tags on."

"But why?"

"Because Wharton knows which one is the original."

* * * *

"After I showed him the warrant,” said the police officer, “he shut the door on us. After we broke down the door, we located him in this room. He was holding one violin. The other was on the table."

"Can you tell me which violin he was holding?"

The officer leaned over and read the numbers on the tags. “I tagged the one he was holding first, so it's the one on the left.” He pointed.

"Thank you, Officer.” Dennis turned to Wharton, who was seated stiffly in a red leather chair, next to the nanofactory. “Whoever programmed the nanofactory was very clever. Faking the carbon-14 count was

a detail few people would have thought of."

Wharton shrugged almost imperceptibly.

Dennis took a deep breath. He was counting on the fact that Wharton had hired someone else to do the programming. “But I found the flaw. The carbon-14 atoms in the fake were not distributed randomly, as they are in the original. Instead, my scan shows they are evenly spaced throughout the violin. Which means this one is the fake.” Dennis picked up the violin on the left and carried it over to Wharton. “I thought you should see your handiwork one last time before I turn it into toothpicks."

Dennis opened the nanofactory's raw materials bin and placed the violin inside. As he moved his hand toward the start button, he watched Wharton's face.

Wharton looked impassively back at him.

"Stop,” Gale said, right on cue. His voice sounded panicked. “I thought you said the one on the right had the regular pattern."

Yanking his hand back from the start button as if it were hot, Dennis said, “Oh, you're right. What the officer said mixed me up about which was which.” He removed the violin from the bin and took it back to the table, exchanging it for the other one.

"A pity to destroy such a thing of beauty,” said Dennis as he put it in the bin. “But it's only a copy.” Again he watched Wharton's face, looking for weakness. The man was obsessed with the Soil Stradivarius. Surely he would not allow its destruction.

Dennis's hand moved toward the start button, and Wharton watched him calmly. Dennis began to press the button, and still there was no reaction.

With a sigh, Dennis pulled his hand away.

"If you are done playing at King Solomon,” said Wharton, “I'd like to be taken back to my cell."

Dennis nodded to the officers, who escorted Wharton from the room.

"I'm sorry. I thought sure it would work,” Dennis said.

"He's a smart man. He saw through the ruse,” said Gale.

"But how could he have been sure it was a ruse? If he had been mistaken, he would have allowed the destruction of the world's greatest violin.” Dennis shook his head. “Would he risk that?"

"Perhaps if it cannot be his, he no longer cares about the risk."

Suddenly it all became clear. “Or he knew there was no risk,” Dennis said. “Would he be willing to go to prison if he knew the Soil Strad would be his when he got out?"

Gale frowned. “I'm not going to give it to him when he is freed."

"That's not what I mean.” Dennis walked over to the nanofactory and pulled up its history, only to find it had been wiped clean. “What if *both* of these violins are fakes? He cleared the nanofactory's history so it wouldn't show he made two duplicates. The real violin could be hidden away, waiting for him to reclaim it after he's served his time."

"Yes, Wharton would risk a few years in prison to get the Soil. I probably would, myself. But why create

two fakes?"

"Because if the police had found this nanofactory setup, but only one violin, they would have suspected a dupe. My company would have been called in to check his nanofactory, and we would have discovered the illegal modifications. But by providing a duplicate and a supposed original, he hoped no one would suspect that he'd created another."

Gale nodded, then said, “Is there some way to be sure?"

"Maybe.” Dennis focused the scanner on the nanofactory's recycling container. “Unused material gets fed back into the system. In order to match the low carbon-14 count in the original violin, that would mean extra carbon-14 would be recycled. We can tell from the amount of recycled carbon-14 how many violins were created."

Dennis ran a few calculations as the scanner counted the carbon-14. When the scanner beeped, the results matched his prediction. “Two violins were made."

"So where is my violin?” asked Gale.

Dennis patted the scanner. “This is the proverbial fine-toothed comb. It may take a while, but I can scan every atom in the house if necessary."

Less than two hours later, Dennis found the violin in a safe hidden under the floorboards of Wharton's bedroom.

"This one is the original,” Dennis said as he handed it to Gale.

The scanner showed that violin to be identical to the other two. At the atomic level, there was no way for Dennis to tell whether it really was the original. On seeing how happy Gale was to have his violin back, however, Dennis decided it was best not to mention that.

Seated on the corporate jet on the way back to L.A., Dennis removed the data module from the nuclear resonance scanner and brought up the atomic scans of the violins.

The two duplicate violins had already been destroyed, and company policy dictated that the scan data be wiped to prevent the creation of unlicensed nanoduplication patterns. He deleted the scan of the first violin, then the second.

But he hesitated when he reached the scan of the third. He looked at the violin pattern for several minutes, remembering the sweet tones of the melody Gale had played.

The finest violin in the world.

Dennis wondered if he could learn to play it.

[Back to Table of Contents]

Reader's Department: **BIOLOG: ERIC JAMES STONE** by Richard A. Lovett

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Eric James Stone grew up on three continents. Born in New York, he was raised largely in Argentina, Venezuela, Peru, England, and Utah.

He was also raised on Golden Age science fiction—short stories, mostly. “My dad had a lot of old anthologies,” he says. He particularly remembers one called *The Early Asimov*, in which Asimov introduced each story with an essay about how it came to be. “I became very familiar with John W. Campbell, Jr., from Asimov's point of view,” he says, “even though I wasn't reading *Astounding* (predecessor to *Analog*). It was my dream that eventually I would be published in *Analog*."

In college, he was torn between political science and computers. Ultimately, he chose the former in part because it had fewer course requirements. That gave him time for creative writing classes, including one in science fiction and fantasy.

Political science led to a law degree, then five years in Washington, D.C., working with a nonprofit organization. That brought him back to computers, when his employer needed a website. “The PR firm said they could create a web page for only about $5,000, and I felt I could probably save money by learning HTML myself,” he says.

That led to a job in web development, back in Utah, where he'd gone to high school and college. Then the fiction bug bit again.

He signed up for a community education class, then took an online course from the same instructor. Much of the course was comprised of writing exercises, and while it wasn't a science fiction course, the instructor wasn't opposed. “He would give us exercises that had no element of fantasy or science fiction and I would always twist them,” Stone says.

Then, at the instructor's urging, he polished up one of his writing exercises and submitted it to *Analog*. He got an encouraging note in the rejection letter, and a year later, he sold “Resonance” (September 2005).

Like many writers, he struggles a bit when asked what makes a good story. “I'm trying to avoid a tautology by saying that what makes a good story is a good *story*,” he says. “I tend to be very much focused on plot and ideas, but that's not enough. There also needs to be a character who engages my interest. I like stories that have beautiful language in them, [but] if there isn't a good plot and interesting characters, then that's not going to work for me."

[Back to Table of Contents]

Short Story: **A JUG OF WINE AND THOU** by Jerry Oltion

The more you depend on high technology, the worse off you are when you lose it. Right?

Normally the autopilot would have kept Michael's air car from crashing into the face of a cliff. The car was loaded with safety features, which was why Michael's dad had let him borrow it for his date with Hannah. It stuck to established routes, and even if it somehow drifted off course, its radar would have sensed the mass ahead and the navigation computer would have steered the tiny two-passenger vehicle well out of the way of danger.

That was the problem. Autopilots were designed for safety, not impressing your girlfriend. So Michael had switched it off somewhere around Oakridge and was flying on manual, swooping up the sides of canyons and flying over the ridge tops in long, graceful arcs that left them weightless for five or ten seconds at a time, screaming like maniacs the whole way. Michael liked how Hannah's breasts rose up inside her shirt when they were weightless, their curved tops pressing together to give her even more cleavage than usual. He was looking at that rather than out the windshield when her scream became very, very real.

He whipped his head forward just in time to see the wall of rock eclipse the midmorning Sun. The interior of the car went dark, and he fumbled for a second, screaming just as loud as Hannah, before he found the autopilot button. When he pressed it, the car tipped upward and accelerated hard. For a second Michael thought it might clear the top, then the air bags blew out of the dash and doors and roof and floor, and a moment later the car struck rock.

The impact jarred the breath out of him, and his knees banged painfully against the underside of the dash. Then he and Hannah spent another few seconds in free fall. Now that it was for real, they didn't scream. They heard a grinding sound from the bottom of the car, probably the fans trying to spin inside crushed housings. Michael had enough time to realize they were probably going to die, take a deep breath, and say, “I love you,” just as Hannah said, “I hate you, Mic—uh."

The car jounced hard, the crack of breaking tree limbs sounding distant through the glass, then suddenly louder when the back window smashed. They spun around crazily, crashed through another tree, and came to a stop facing downward at a steep angle.

The air bags slowly deflated, letting them sag against their seat belts. The windshield was a sheet of tiny cracks tinted green. The air was thick with the smell of sap and pine needles. There was an ominous crackling sound coming from the back, either batteries dying or branches breaking.

Michael looked over at Hannah. He didn't see any blood. Her eyes were wide as a druggie's, but both pupils were the same size. Her curly brown hair looked like a comical explosion around her head, just as it always did. “Are you all right?” he asked.

"You're bleeding."

"Huh? Where?” He didn't feel hurt anywhere except his knees, and she wasn't looking down that far. In fact she was looking at his face.

"Your nose,” she said.

He reached up and rubbed the back of his right hand against it, and his hand came away red. Now it hurt.

"Must have been the air b—yow!” The car lurched downward for a terrifying instant, then tipped over

onto Michael's side. Hannah slid toward him, her harness keeping her from landing directly on him.

"We should get out of here while we still can," Michael said.

That proved more difficult than it sounded. The car was resting on his door, and Hannah's door was bent badly enough that it wouldn't open, even when they unstrapped themselves and stood on Michael's door and pushed up with their combined strength, which wasn't all that much, since Michael's left knee hurt like hell when he put his weight on it. Hannah's window wouldn't roll down either. The back window was gone, but the trunk of a tree blocked it.

"We've got to bust out the windshield," Hannah said.

"Right." Michael looked for something to smash it with, sniffling to keep his nose from bleeding all over everything, but the most massive thing in the car was his foot. He kicked at the spiderwebbed glass with his right toe, then turned around and tried his heel—fumbling for balance and bumping into Hannah while he did. Standing up in a sideways car was awkward business. Normally he wouldn't have minded the gymnastics with her, but for the moment the situation had driven prurient thoughts right out of his mind.

"Let's try it together," he said. "On the count of three. One, two, *three*."

They both swung their heels at the shattered windshield, and this time it gave a little. Two more kicks knocked a heel-sized hole in the plastic sheet that held all the glass fragments together, and a couple more started a tear that they were able to push farther along a little at a time until it was big enough for Hannah to squeeze through.

"Don't cut yourself," Michael said.

"I'm not stupid."

She might as well have slapped him. He hadn't had a chance to think about it yet, but now he realized that this whole thing was his fault. He had been stupid, and he had damned near gotten them killed.

"I'm sorry," he said.

"Don't be." She ducked down and squeezed through the hole. Michael saw branches wiggling outside the windshield, fractally distorted by the shattered glass. "Stand back," she said, and a moment later a stick sliced into the gap, widening it an inch or two with each blow until she had cleared a big enough space for Michael.

They were on the uphill side of a cluster of trees partway up a steep, rocky slope: the talus cone of debris that had fallen off the cliff over millennia. If they hadn't landed in the trees, they would have bounced all the way to the bottom of the slope. Michael looked up at the lip of the cliff several hundred feet above. There was a fresh scar only a few feet below the edge.

"We almost made it," he said.

Hannah snorted. "That makes me feel better."

"I really am sorry. It was stupid to fly so close to—"

"Forget it. Just call for help."

He took his phone out of his pocket and stretched it out to talk, dialing 911 as he did so. He stuck it in his ear and angled the mouthpiece forward and waited, but nobody answered.

"No signal?" He tapped the phone's display on and looked toward the dark green foliage of a tree so he could see the holographic projection, and sure enough, the signal meter showed no bars.

"What do you mean, no signal?" Hannah said.

"It says no signal. The cliff must be blocking it." He turned around and saw that there was an equally large cliff on the other side of the canyon. They were about two-thirds of the way down in a narrow notch between mountaintops.

She tried her phone, but had no better luck. "Great. So now what?"

"The car should be transmitting an emergency signal," Michael said.

"Didn't you switch off the locator when we started flying on manual?"

"Oh." He had, using a hack he'd gotten off the 'net. As far as the car knew, it had continued on from Oakridge to Diamond Peak. Michael had figured his father would give him a stern lecture about flying on manual if he ever checked the car's log, but he wouldn't know what kind of flying Michael had been doing. Only now the car's emergency locator beacon wouldn't be transmitting their correct location.

"They'll still be able to follow its signal to the source," he said.

"You think it's going anywhere the phone signal isn't?"

He didn't know. An emergency beacon should be powerful enough to punch through just about anything, but maybe not entire mountains. Would it reach a satellite overhead? That assumed it was even transmitting. The crackle of dying batteries made him doubt that it was. He wondered if the car would catch fire, but there was no smoke yet, and after a few minutes the crackling stopped.

It was a little chilly in the shade of the cliff. The Sun was shining brightly on the opposite side of the canyon. "Even if the car is transmitting," he said, "I guess it makes sense to move down into the sunlight and look for a flat spot where a rescue car could set down."

She nodded. "Okay. What should we take with us?"

Michael tried to think. They were both dressed in pants and short-sleeved shirts, hers with wide open strips in back. He had fantasized about slipping his hands beneath those strips when they stopped to admire the view from the top of Diamond Peak, but now he wished she had worn something less sexy. They had no coats, no camping gear, no flashlights other than the ones in their phones, no food. Wait a minute. "I brought a bottle of wine and a picnic blanket," he said.

"Oh, great," she said. "A little booze. That'll do us a world of good. Maybe we can get drunk by the time the cops show up." She narrowed her eyes. "And just what were you planning with your bottle of wine and your blanket, anyway?"

He felt himself blush, hoped it was invisible beneath all the blood on his face. "I, um, thought we'd drink it and ... watch the clouds go over."

"Oh, right, whoever was on the bottom, anyway."

"Hannah, look, I said I was sorry."

She glared at him a moment, then said, "Get your wine and blanket. If we're still up here when the Sun goes down, we'll be glad we have it."

Michael hobbled once around the car before he climbed back in, making sure it wasn't going to bounce all the way down to the bottom of the canyon with him in it. It looked to be wedged solidly against the trees, so he climbed back in through the windshield and got the bottle of chardonnay and the blanket from behind the seat. While he was inside he tried to undo the hack he'd put in the navigation system, but the computer wouldn't respond. He couldn't even get an activity light in the instrument panel. The car was as dead as Michael's privileges would be when his father got through with him.

He climbed back out and he and Hannah set off down the talus slope, stumbling over the loose rock. The copse of trees that had stopped their fall was on a little island amid the desolation; there was nothing like a smooth path away from it. Michael's left knee hurt like hell with every step. He barely made it a hundred yards before he said, “I've got to make myself a crutch or something."

"Out of what?"

"A tree branch would do.” He looked longingly up at the trees they had just left. There were plenty of broken branches around them.

"I'm not climbing back up there,” Hannah said.

"Me either.” He looked below. There were more trees off to their right. “Let's angle that way."

It was all he could do to hobble the fifty feet or so to the next copse of trees. Hannah went ahead and found a dry branch for him, and he smacked the end of it against a rock, breaking off little pieces until it was the right length to lean against. It had a fork to put under his arm and everything. He wadded up the blanket to pad his armpit and took a few experimental steps.

"All right, now we're in business."

"Oh, sure. Miles from anywhere and you on a crutch; we're in great shape."

"We're in better shape than we were a minute ago."

There was no denying that, so she just turned away and led the way down toward the bottom of the canyon. They emerged into sunlight at about the same point where the vegetation grew thicker. Michael supposed that was no coincidence. Trouble was, the bushes were thick enough to get in the way, so he and Hannah had to push through their scratchy branches to make any progress downhill.

Now that he was moving, the Sun provided more heat than he needed. The stick in his hand felt rough and knobby. His knee hurt even when he wasn't putting his weight on it. His feet were beginning to hurt, too. He had always thought of himself as an outdoors sort of guy, but he had never been this far from civilization.

Every few minutes he tried his phone, but they were going deeper into the canyon rather than out of it.

"You know,” he said after half an hour or so of bushwhacking, “I'm beginning to wonder how smart this is. We're getting farther from the car every minute, and we still haven't found a good landing site."

Hannah stopped. Her shirt was soaked with sweat. Her skin glistened in the open strips across her back. It was still pale, but it wouldn't be for long if they stayed in the Sun. “What do you suggest we do?” she said.

"Find some shade, first off,” he said. “Rest a little. If a rescue car comes, they'll be able to see where to land and they can direct us there."

"If?"

"When."

She took a deep breath, then nodded slowly. “All right. That sounds better than getting lost."

There was another copse of trees just a little way farther down. The rocky slope had given way to forest floor, so they had relatively smooth ground to lay the blanket on, once they tossed some pinecones and sticks aside, and a good view down the canyon, where rescue would presumably come from. It felt good to sit. Water would have been good. Michael considered opening the wine, but he would just as soon not be rescued with alcohol on his breath.

It was a beautiful day. The sky was deep blue, with stark white puffs of cloud drifting lazily along. Birds flitted from tree to tree. A squirrel chattered at them from overhead.

Hannah wasn't saying much.

"Do you really hate me?” Michael asked.

"Huh?"

"When we crashed, you said, ‘I hate you.’”

"I did?"

"Yeah."

"Wow. I don't remember that."

"You've ... you've been acting pretty mad since then, too."

"I guess I have.” She turned to face him. “Look, I'm sorry. This isn't a whole lot of fun. I'm scared. What if nobody comes?"

"Somebody will come."

But the afternoon wore on, and nobody did. Various animals came to check them out, including a fat brown marmot that shuffled past only a few feet away. Michael wondered if he could snatch it if he became hungry enough. It didn't seem to have any fear of him.

Hunger wasn't the problem anyway. Thirst was. He and Hannah eventually cracked open the wine and drank a few swallows each, but that was little help. It didn't even taste all that good.

"Maybe we should light a signal fire,” Hannah finally said.

Michael slapped his forehead. “We should have thought of that hours ago.” Then he realized they had no way to light one.

"How about the wine bottle?” Hannah asked.

"The wine bottle?"

"Use it as a lens to focus sunlight. The wine is almost clear; if we peel the label off and hold the bottle sideways it should act like a big magnifier."

He looked at her as if she had just explained the meaning of life. But when they gathered a bunch of twigs

and held the bottle over them, the bright spot focused through its side never grew quite hot enough to ignite them. Not even dark leaves would burst into flame.

Michael tried rubbing sticks together and smacking rocks together to make sparks. That didn't work either.

"I think we're going to have to walk out of here," Hannah said.

Walk out? They had to be fifteen or twenty miles from Oakridge, and that was air miles. But they weren't on a regular flight route, and nobody had come for them all day, which pretty much meant that the emergency beacon wasn't working. Slowly, reluctantly, he said, "I think maybe you're right."

They both looked down the canyon. It was narrow and steep as far as they could see, eventually bending to the west about five miles or so away. Even so, it was better than going uphill. And they figured downhill had a better chance of leading them to civilization anyway.

They were both stiff when they started out, but they soon loosened up. Michael's knee hurt about as much as before.

When they made it to the bottom of the canyon they had their first bit of luck: There was a little stream trickling over the rocks. They drank their fill, and Michael washed the blood off his face, then they set off downstream. They kept the three-quarters-full wine bottle. It would be useful as a canteen even if they didn't want the wine.

A mile or so down the canyon, they came across a road. At least it had been a road fifty years ago. Now it was overgrown with trees as big around as Michael, but there was definitely a flat shelf of ground that hugged the canyon wall a few hundred feet above the stream. It was much easier going than before.

They had made maybe two miles by the time the Sun disappeared behind the western cliff. Within minutes, the temperature began to fall. They continued on, their exertion keeping them warm, until an hour or so later the light began to fail.

"I think we'd better find a place to hole up for the night," Michael said.

"That sounds inviting," Hannah said sarcastically, but there was a note of relief in her voice. This was probably farther than she had ever walked in a day, and certainly over the roughest terrain.

There were plenty of places to choose from. Hollows beneath big boulders, mossy patches beside downed trees, sheltered bowers beneath standing ones. Neither Michael nor Hannah had any idea what would be best. They finally settled on a spot under a boulder because the rock was still warm from the heat it had soaked up during the day. They spread their blanket and sat on it, and that was camp.

Neither one mentioned that they were hungry, but their growling stomachs announced it several times. Michael wished he'd paid more attention to the bushes they had passed during the day, but even if any of them had held berries, he wouldn't have known which ones were safe to eat. He remembered the marmot that had walked by only a few feet away that afternoon. He would definitely try to grab one of those now if it came by again.

He had just about fallen asleep with his back to the rock when he heard a scrabbling sound in the pine needles off to his left. Without moving his head, he looked over and saw a big bird walking along in the shadows toward the stream. It was surprising how well he could see it in the twilight. Simple dark adaption in his eyes, or was some primitive hunting instinct kicking in? He hoped it was the latter. He tensed his muscles, waiting until the bird was right in front of him before he leaped.

He only got a long, brown-and-black striped tailfeather. The bird squawked and leaped away, its wings roaring like sudden thunder in the silent forest. Hannah jerked awake with a scream.

"It's all right," Michael said. He put his arms around her. "It's okay. Just a big bird. I tried to catch it."

It took her a moment to make sense of what he said.

"Why?" she asked.

"To eat!"

"Raw? Yuck."

He hadn't thought that part through. Was he hungry enough to eat a bird raw? Maybe not. Not yet. But they still had a long way to walk tomorrow, and he would be a lot hungrier in the morning.

Hannah started to shiver. Her lightweight shirt was no good for warmth. Michael wrapped the blanket around her, then took her in his arms and wrapped himself around her as much as possible. It felt almost romantic, but if she thought so, she wasn't letting on.

Cold, tired, hungry, lost, and if they ever did make it out of here, in deep trouble with their parents. Michael was finally beginning to understand the depth of the trouble he was in. It was time he did something to turn the tide.

He took his phone out of his pocket and tapped on the display. Still no signal. Plenty of battery, though. He considered the irony of that. There was probably enough energy in his phone battery to run a heater most of the night, but no way to get to it.

He shivered involuntarily. It was getting colder. Pretty soon he would have to ask if he could join Hannah inside the blanket. She would let him, of course, and it would be physically wonderful, but somehow he suspected that would be the end of their relationship. Huddling together for warmth because of his screwup was not how either of them had wanted to spend their first night together.

He almost laughed at the knowledge of what he carried in his pocket. Just in case, if things had gone extremely well up on Diamond Peak, he had brought along a condom.

The bird—a pheasant?—walked by again. He hadn't scared it much. It knew he was harmless. His kind could level cities if they wanted, yet two alone in the wilderness were as harmless as a couple of kittens.

He needed a weapon. His crutch? He could knock the bird's head off with it if it would stand still long enough to give him a good swing. He picked up the stick as gently as he could, but the bird skittered away, just out of reach.

The forked end that he had put under his arm all day would make a good slingshot if he had ... some rubber.

He laughed out loud at the image.

"What?" Hannah asked sleepily.

"Nothing," he said. "Go back to sleep." He unwrapped his arms from around her and stood up.

"Where are you going?"

"I've got to pee." That much was true. He did that behind a tree a few dozen feet away, then took the

condom from his pocket and unrolled it. Guaranteed not to break under any circumstances. He wondered how extensively the manufacturer had tested that claim. He tied the ends to the forks of the stick and gave it an experimental tug. It stretched way more than he expected, and when he let go it flapped forward, but not with much force, so he untied it, doubled it, gave it a couple twists, and retied it. This time it took quite a bit of effort to pull, and it shot forward with a loud *snap*.

"What was that?" Hannah called out.

"Just me. It's okay."

He picked up a thumb-sized rock and put it in the middle of the condom sling, stretched it back, and let fly at a tree trunk. The rock hit it with a satisfying *thunk*.

In the dim light of the dying day, he grinned like a wolf.

The bird heard him coming and walked faster. Michael stopped, and so did it. Fifteen feet away. Could he hit it at that range? Only one way to know. He stretched the condom back as far as he could, aimed for the middle of the bird's body, figuring if he missed a little he would still hit something, and let fly.

The rock whacked solidly into the bird's side. It squawked and leaped into the air, but when it flapped its wings, the one Michael had hit folded up and the bird fell to the ground again.

He leaped forward and kicked out with his right foot. Pain lanced through his left leg, but he connected with the bird and lofted it another twenty feet, where it fell to the ground, stunned. Using the stick for balance, he rushed up to it and stepped squarely on its body, then smacked its head again and again with the stick until it was dead.

"Michael!" Hannah shouted. "Michael, what are you doing?"

"Catching dinner!" He picked up the bird by its still-twitching feet and carried it back to their hollow.

She looked at him in open-mouthed astonishment. "You caught it!"

"I did." He couldn't keep from grinning, wouldn't have even if he could.

"What's that on your crutch?"

"I made a slingshot."

"Out of what?"

"Um..." he tucked it under his arm, but she had already seen enough.

"You brought a condom?"

"Guilty."

"Did you really think—?"

"I had hopes. Now I have a slingshot, and we have a pheasant for dinner."

"And no way to cook it."

"I'm not so sure about that. How's your phone charge?"

"What does that have to do with anything?"

"We've got two phones. We can sacrifice one's battery to start a fire."

"How?"

"Short circuit it." He laid the pheasant on the ground and took his phone out of his pocket, along with what loose change he had. Three dollars and a quarter. More than enough.

They gathered up a pile of dry leaves and small twigs, then he popped the battery out of his phone. There were two contacts about half an inch apart. He set the battery on the ground with the contacts facing up, then pressed a dollar into either contact. He tilted them toward one another, practicing, then had Hannah cover the whole works, his hands and all, with leaves.

Then he brought the dollars together. There was a flash like a camera, and a loud pop, and a curl of smoke, but even though Michael blew on the leaves, they didn't burst into flame.

He tried it again. Another flash, more smoke, yet no flame.

"Okay," he said, "We go for broke. Shove the leaves down against my hand and keep them there."

He brought the dollars together and held them while the battery sparked and smoked, and this time the extended arc touched off a tiny flame, which quickly spread.

Hannah jumped back, waving her hands frantically. Michael forced himself to be gentle as he extricated his from beneath the burning leaves. He brought the battery and dollars out with him, although he was pretty sure all were useless now. He wanted them for souvenirs.

They built up the fire with larger and larger sticks until it cast light and heat all through the hollow beneath the rock. Hannah laughed in delight at the crackling flames, turning herself around and around to toast herself front and back. It was amazing how quickly their spirits rose now that they had regained the basics of civilization. They wouldn't freeze or starve. Tomorrow they could walk the rest of the way to Oakridge, or they could just throw green branches on the fire and wait for searchers to see the smoke.

The wine even tasted better now.

Cleaning the bird was a messy, awful business, but their hunger drove them on, and when they skewered its body on a stick and held it over the fire, the aroma alone proved that the effort was worth it.

They pulled pieces off as it cooked, feeding their hunger, then feeding one another. Michael licked Hannah's fingers when she fed him a piece, then leaned forward and licked her lips.

The firelight glinted in her eyes. "So," she said. "When we started out this morning, were you optimistic enough to bring a second condom?"

[Back to Table of Contents]

Probability Zero: **ARMCHAIR SCIENTIST** by David Bartell

Dear Fellow Armchair Scientist,

Thank you for your submission to *Armchair Scientist*, the revolutionary alternative to the biased, elitist, so-called "leading" scientific journals. Unfortunately, we must pass on your paper at this time.

Fully 93.057% of papers submitted to *Armchair Scientist* are turned down for one or more of the reasons listed below. While we would like to provide you with a personal rejection, we're fairly certain that one of these top reasons applies to your paper.

1. Interesting concept, but consider circularizing your logic a bit more. Readers prefer theories with at least a sense of closure.

2. Your Grand Unification Theory (GUT) is too complicated to suspend disbelief. For example, you may have employed an excessive number of sub-atomic particles or spatial dimensions for our readership. We find it is best to avoid logical impossibilities such as non-determinism, wave-particle duality, and tachyon paradoxes.

3. Your cover letter credits more than one person with the paper. Remember, the armchair scientist rides alone.

4. Lack of maverick attitude in the writing. As a suggestion, coin yourself a provocative pseudonym like "GUTbuster" or "God's Dice," and establish a contrarian online presence. Anonymously argue with as many "experts" as possible, even if you agree with them. Get in their faces. Then emulate the emotion of their rebuttals in your next submission to us.

5. Your credentials are impeccable.

6. Your theory does not challenge enough well-established scientific principles for our readership. Newton was wrong, Einstein was wrong, *ergo* it stands to reason that nearly everybody else is probably wrong too.

7. Because you propose a testable theory, it too might be proven wrong in the future. The armchair, not a lab bench, is the true throne of science.

8. Too much data and not enough speculation. Hint: try cleverly relating your theory to a seemingly unrelated discipline with which you are familiar. Published authors have successfully drawn analogies to such topics as Nirvana viruses in Zen computing, revisionist theopaleontology, and the topology of zipperless fly fishing waders.

9. Too many references cited. This can undermine the perception of originality in an article.

10. There is no clear science-fictional aspect "extrapolatable" from your idea. Never forget that like an armchair, science is the seat of dreamers.

[Back to Table of Contents]

Reader's Department: **THE ALTERNATE VIEW: COLD FUSION TURNS 20** by Jeffery D. Kooistra

March 23, 2009 marks the 20th anniversary of the public announcement of cold fusion, now often called LENR (for Low Energy Nuclear Reactions) or CANR (for Chemically Assisted Nuclear Reactions). Personally, I think a better term is CMF, for Condensed Matter Fusion, or perhaps CMNR for Condensed Matter Nuclear Reactions.

It's always hard for me to write about cold fusion; it brings back too many bad memories of how poorly "my guys," the physicists, conducted themselves. If the Oxygen and History channels ever get together to produce a TV show called "Scientists Behaving Badly," the first episode should deal with how physicists, fusion physicists in particular, acted in the weeks and months following the cold fusion announcement. To be honestly skeptical was to be expected. Given the unexpected nature of the discovery, even shock and a knee-jerk refusal to believe are not surprising. But to resort to scurrilous invective and character assassination against their scientific peers Stanley Pons and Martin Fleischmann (as well as others) in an effort to squelch the discovery of cold fusion is the behavior of riff-raff, Ivory Tower riff-raff though they may have been.

However, in the intervening twenty years, the reality of the "cold fusion effect" has been established beyond a doubt to all except those who refuse to look at the evidence, or who would not believe it regardless of evidence. Hence, there seems little point in recounting once again the sad early history of CF, a tale which is on its way to becoming a footnote, and a footnote destined to be dropped in later editions at that. Rather, it is time to accept the reality of cold fusion, to educate the lay public about it, and to decide just what it is we're going to do about it, in terms of Ph.D. projects, future government spending, and its potential for meeting our energy needs. (Yes, I realize that many of my readers will take offense at the preceding statement. So be it. I no longer feel I am going out on a limb by saying that cold fusion is real. I think we've reached a point where the deniers are now going out on a limb.)

To this end, I wish to introduce you to a recent book about cold fusion: The *Rebirth of Cold Fusion: Real Science, Real Hope, Real Energy*, by Steven B. Krivit and Nadine Winocur, Psy.D. (ISBN: 0-9760545-8-2) Krivit also runs the website www.newenergytimes.com, which is well worth your time to visit and bookmark. The foreword to the book is by the late and dearly missed Sir Arthur C. Clarke. Clarke had long been a believer in CF, right from the beginning, and had the courage from the get-go not to back down in the face of the blistering derision of the discovery by the hot fusion community. He even went so far as to put his money where his mouth was—*Infinite Energy Magazine* benefited from his charity, for instance.

Clarke says something in the foreword that merits repeating here (since if you won't listen to me, perhaps you'll listen to him). Note this well, since it has bearing both on CF and on future controversies (which are inevitable and likely coming soon). Clarke says:

"The neglect of cold fusion is one of the biggest scandals in the history of science. As I wrote in *Profiles of the Future* (1962), 'With monotonous regularity, apparently competent men have laid down the law about what is technically possible or impossible—and have been proved utterly wrong, sometimes while the ink was scarcely dry from their pens. On careful analysis, it appears that these debacles fall into two classes, which I will call Failures of Nerve and Failures of Imagination.
"Today, the cold fusion controversy falls into the first category, Failures of Nerve; many vital facts have been discovered, yet sceptics lack the courage to acknowledge them or their immense implications." (p. xvi)'

Clarke had the special wisdom acquired from living through some of the most technologically explosive

times this planet has ever seen to put the CF situation into proper perspective. The controversy is one of those unfortunate things that happen “with monotonous regularity” when an unforeseen discovery with great potential appears on the scene.

The book is divided into four parts. Part one deals with “Global Energy, Global Concerns” and covers the (simplest) basics of cold fusion, and the hope and skepticism that greeted the discovery. Also covered in layman's terms are climate change, fuel scarcity (current headline stuff), nuclear fission, hot fusion, hydrogen technology, and assorted exotic forms of future energy.

Part two is called “A Historical Perspective” and covers the largely sad story of cold fusion and details what happened and to a large extent, why it happened, again in terms a non-scientist can appreciate. This is perhaps the most valuable thing the book adds to the canon of cold fusion literature. If there is one thing that has become clear in the twenty years since the advent of CF, it is that presenting the straight scientific facts in straight prose and to a significant level of detail doesn't sway set-in-concrete, or even set-in-Jell-O, opinions one damn bit. There is no hope in convincing scientists who were on the scene in 1989 of the truth that was evident even then, if they haven't yet come around on their own. However, the weight of lay public opinion can make for profound policy changes, so the authors do a great service in making the history and potential promise of CF easy to understand.

Part three is called “Discoveries and Mysteries.” It is a coherent recitation of the objections raised against the possibility of cold fusion, and how experimental work during the decades since the announcement has answered these objections and confirmed beyond a doubt that nuclear processes are really happening in condensed matter. Indeed, the proof in the form of fusion byproducts is what the fusion physicists demanded way back in the beginning.

Finally, part four is a short section called “Reflection and Anticipation,” and provides some cogent comments on what lessons we learned from the story of CF, as well as some cautions concerning what CF brings to the questions of academic freedom and national security.

I must admit that some sections and comments in part one I simply don't agree with or see in a different light than the authors. For one thing, I am an advocate of conventional nuclear power, and they are not, reciting some of the usual arguments concerning supposed dangers and hazards. However, the authors are canny enough to treat nuclear power as at least a mixed blessing, and accept that the world is likely to go in the nuclear direction in the future. But they hold out cold fusion as perhaps the better, and long sought for, alternative.

Part two is the most difficult for me to read without resurrecting the anger I've felt over the years at the way otherwise decent physicists and decent men or women resorted to juvenile derision and brainless hypocrisy in their attacks on cold fusion. One example is the way that perfectly good scientists, even those with long and distinguished careers, were treated, and still are treated, as mere kooks.

The following is a quote from page 145, which says exactly what the intelligent layman can understand even if the scoffing scientists cannot:

"Many critics contend that, in order to achieve credibility, cold fusion must be verified by people whom they consider to be reputable, mainstream scientists. This is, in fact, an inane and biased position, because many cold fusion scientists have been involved with conventional science and even, in some cases, hot fusion research for two or three decades! *The caliber of these researchers is what one would expect from any mainstream, reputable scientist.* Most proceeded quite cautiously before identifying themselves with cold fusion. Michael McKubre of SRI International, for example, reports that only after a full year's research did he become convinced that the field of cold fusion contained a legitimate scientific endeavor.” (Emphasis mine.)

Part three covers in comfortable detail some of the results later CF researchers (the mainstream, reputable ones) have verified since the initial discovery. In the earliest days, the detractors had pointed out that CF couldn't possibly be real, because to produce the amount of energy that Pons and Fleischmann had said they measured via fusion, there would have been such intense neutron radiation that it would have fried them. That the two electrochemists were alive to make their claim was immediate evidence that they were wrong.

However, as it turns out, cold fusion is largely aneutronic. In fact, as Nobel Laureate Julian Schwinger said in the beginning, the counter argument to the dead electrochemist charge is this: “The circumstances of cold fusion are not those of hot fusion.” (p. 203) In the past I've been hesitant to say that cold fusion actually *is* fusion, but now I'm comfortable with the claim since fusion byproducts have been found. As Michael McKubre (who has done more careful, diligent CF work than almost anyone else) has said: “It turns out that the nuclear products are helium-4, helium-3, and tritium, which are the products of fusion. I use the phrase ‘cold fusion’ now. I didn't use it two or three years ago because I wasn't certain what the effect was. I thought it was unreasonable to assert a mechanism when you had no proof of that mechanism. Now, we have adequate proof that the mechanism is a fusion reaction. I know with certainty that we have a nuclear effect that produces heat and fusion products. We're entitled to use the phrase ‘cold fusion.'” (pp. 175-176)

When it comes right down to it, the primary signature of cold fusion is simply the generation of heat energy in the cell. The heat is produced in quantities far in excess of what could be accounted for by anything other than a nuclear reaction (unless there are other factors at work that require entirely new physics). Regardless of the exact details of what goes on inside the cold fusion cell, if it produces heat in sufficient quantities, it can be used as an energy source, just like oil, gas, or uranium.

My favorite section of part four begins on page 259 and consists of long quotes from scientists and others that were in the thick of the cold fusion furor. These statements from men like John Bockris, Sir Arthur C. Clark (again), George Miley, Edmund Storms, and Martin Fleischmann are well worth taking to heart.

* * * *

If I had a hundred dollars to divide up in a nuclear energy research budget, I'd give $75 to hot fusion via the means described by Tom Ligon in the January/February 2008 *Analog* article, “The World's Simplest Fusion Reactor Revisited.” I'd give $20 to cold fusion research—I'm not convinced that it will ever serve for large-scale energy production, but it might. And even if it doesn't, it might make a dandy nuclear battery! I'd hand out the remaining $5 to the hot fusion community, just to preserve their expertise in plasma physics. They've had billions of dollars and around fifty years to produce a hot fusion power plant via their ideas of how it should be done. They've failed.

That's the real truth that hot fusion folks don't want to face.

[Back to Table of Contents]

Short Story: **THE INVASION** by H. G. Stratmann

First contact may not happen the way *either* party suspects.

The president of the United States shivered, wondering if the next hour would bring salvation or destruction to the human race. Her worried frown was mirrored in the faces of the National Security Council members filling the chairs at the long conference table. The only smile in the well-guarded White House room belonged to the famous astronomer sitting immediately to the right of where the president sat at the head of the table.

Arthur O. Lewis, director of the Search for Extra-Terrestrial Life Foundation, slid a bulky pair of glasses back up the bridge of his nose. His unruly shock of fine sandy hair and the bright boyish grin beaming from his clean-shaven face made him resemble a college freshman instead of the middle-aged owner of doctorates in astronomy and computer science. The trademark turtleneck sweater and khaki slacks he sported stood in stark sartorial contrast to the stiff business suits and military uniforms worn by the dignitaries around him.

Lewis spoke with the high-pitched enthusiasm of a nerdy teenager describing the details of his first date with a real girl. “Don't worry, Madam President. Today could be the greatest day in human history!"

The president looked uncertainly at the dark screen of the device resembling a laptop computer that the astronomer had just set up in front of her. She said, “Or it might be our last day. I almost wish this machine of yours wouldn't work."

Lewis gleefully stroked his index finger over the tachyonic transceiver's power button, barely restraining his impulse to depress it as he replied. “The electronic engineers who built it based on the plans the aliens sent us believe it will work. True, the theoretical physicists we consulted still don't understand how it can send and receive signals faster than the speed of light. But we really don't need to know exactly how the transceiver works to be able to use it. After all, most people who use computers don't have any idea how a CPU functions."

The puzzled expressions on the room's other distinguished occupants suggested they didn't know what a “CPU” was, much less what it did. The president said, “Dr. Lewis, do you think the aliens who sent that message you received already know of our existence?"

"I don't think so. The signals our radio telescope network picked up were omnidirectional rather than beamed specifically at Earth. We also discovered that the aliens’ transmissions didn't begin recently. Our review of old magnetic tapes from the first SETI programs over fifty years ago, like Project Ozma in 1960, showed that some packets of their message were being transmitted even back then."

The president frowned. “What do you mean by ‘packets?’”

Lewis said, “The original SETI investigators tried to detect data being transmitted in a linear, analog fashion—the same way signals are received on a conventional AM or FM radio. They used single-channel receivers limited to monitoring just one frequency at a time and confined their search to a narrow range of frequencies, such as those around the twenty-one cm wavelength of radiation produced by interstellar hydrogen. Those initial surveys also listened for signals from only one star at a time and checked only a few nearby ones, like Tau Ceti and Epsilon Eridani."

The astronomer grinned. “But the way the aliens sent their message was much too complex to be detected by simple methods like that. They disassembled and formatted their message into many discrete fragments or ‘packets’ of binary code difficult to distinguish from random noise until you put them back together.

"Then those packets were transmitted in a manner similar to the ‘frequency-hopping spread spectrum’ technology used in some wireless computer networks. To put it simply, the aliens sent each digitized signal over a broad range of frequencies instead of only one. About every hundred milliseconds the signal ‘hopped’ from one frequency to another within that range in a recurring pattern. Finally, packets containing separate parts of the complete message were transmitted in signals originating from *several* nearby stars instead of just one. The specific stars we discovered parts of the message coming from included—"

The president interrupted him. “That all sounds very complicated, Dr. Lewis. Why did the aliens make it so difficult to detect their signals?"

The scientist shrugged. “Perhaps they're only interested in communicating with civilizations that have achieved at least our current level of technology. Those first SETI investigators simply didn't have the equipment or techniques available to discover more than a tiny piece of an incredibly complex puzzle. Even with the large-scale distributed computing methods we now use, the raw computational power needed to monitor so many frequencies, integrate those multiple extraterrestrial signals, and reassemble all the data packets into their original form wasn't available until recently.

"But once we had the aliens’ complete message, it didn't take our linguists long to translate it with the help of the foundation's new supercomputer. They discovered the message only contained instructions for building and using this device."

Lewis tapped the edge of the tachyonic transceiver. “This machine will let you become the first human to instantly communicate and exchange messages with the aliens who broadcast those signals—to make ‘first contact’ with an intelligence far greater than ours. I hope you'll decide to take advantage of this history-making opportunity."

The president smiled sadly. “I knew winning this office held many heavy responsibilities, but I never expected this to be one of them."

She looked questioningly at the other officials seated in the room. “I would appreciate more advice before I make my final decision whether to use Dr. Lewis's device."

From the far end of the conference table the director of national intelligence said, “Dr. Lewis, we all appreciate the admirable discretion you and your staff exercised by keeping your discovery of the aliens’ message and its contents secret. I hate to think of the worldwide panic that might have occurred if any of you had spoken with the media about it before we clamped a security lid on everyone concerned."

The astronomer grinned humbly. “I hope what the president and all of you choose to do here today will validate our refraining from going public with this. Though my staff and I were sorely tempted to give a press conference about our discovery, we finally agreed that the decision whether or not to contact the aliens had to be made by the people who held the greatest responsibility for dealing with the results of that choice."

The director of national intelligence looked back at him suspiciously, wondering whether this otherwise brilliant scientist was incredibly naive or being subtly sarcastic. He replied, “Thank you for having such faith in us."

Then the director's voice turned low and dark. “But tell me, do you have any idea *why* aliens would send us the plans for that device?"

Lewis shrugged. “There's no such thing as an expert on exopsychology. Anything I say is speculative. Perhaps the aliens have motives that our mere human minds couldn't possibly understand. Or maybe, in

some ways, the aliens do think like us. It's possible that they too are curious to find out whether intelligence has evolved elsewhere in the galaxy and what form it's taken."

He pointed to the silvery metal transceiver resting in front of the president. “Perhaps they're eager to share their own religious and philosophical insights into the meaning of existence with us. Beings capable of this level of technology may be as intellectually and morally advanced above us as we are from *Homo habilis*."

Lewis's eyes peered out into the misty distance through thick lenses. “Or perhaps, as those beings gazed up at a clear night sky into the vast silent Universe, they felt a great melancholy emptiness within them. The information they sent may have been like a message in a bottle, tossed out into the vast ocean of space with a prayer that somewhere, someone they could call ‘friend’ would find it and let them know that they were not alone. This device they taught us to build could be a ‘laptop of loneliness,’ the instrument by which they hope we'll answer their plaintive plea for companionship."

The chairman of the joint chiefs of staff grunted. “That sounds fishy to me. *I* think it could be the worm on a fishing hook—the bait for a trap!"

He squinted acidly at Lewis. “If we follow your suggestion, we could be letting immensely powerful and hostile creatures know we exist and where Earth is. Their ‘answer’ might be a fleet of flying saucers and armies of death ray-wielding robots dropping out of the sky over our cities!"

The president stared at her general, worried about his taste in movies and recreational reading material—and unsure whether he was really serious. After deciding she'd rather not know if he was, she replied, “While that possibility seems a bit ... remote, I must consider every ramification of making what Dr. Lewis calls ‘first contact.’ Earlier in this meeting you all heard him describe the many potential advantages of beginning a dialogue with these aliens.

"Besides the religious and philosophical insights he just alluded to, they may provide us with practical solutions to many of the problems facing our world today. If they really could help us solve the energy and environmental crises we face, provide us with the medical knowledge to live longer and healthier lives, and teach us how to coexist in harmony with each other, then this device might indeed be our salvation."

A disapproving voice along the side of the table interjected, “Or those same ‘benefits’ could wreck our economy!"

The secretary of the treasury continued, “Say these hypothetical aliens send us information about cheap, safe energy sources that eliminate our current dependence on oil, gas, coal, and nuclear power. That could make millions of workers in those industries lose their jobs and destroy the value of some of our largest corporations!

"Or if the aliens told us how to cure cancer or heart disease so people lived longer, the money we'd save by spending less on healthcare might be far outweighed by the greater amounts we'd pay in Social Security and other benefits to recipients who would now be living many more years than we've planned for! I know this sounds harsh, but we don't want to unintentionally cause more harm than good."

The secretary of defense nodded his perspiring brow. “For all we know the aliens really might want Earth's nations to get along better with each other—but for their own ends. The aliens could *want* us to reduce military spending so we'll be less prepared to defend ourselves when they attack!"

The secretary of state looked at her colleague dubiously. “I won't even guess what the aliens might do, but I am concerned about the threats some of our fellow humans are making. While the public may still

be in the dark about Dr. Lewis's discovery, rumors of what's going on have leaked out to several of our allies and a few unfriendly powers. They're all demanding we give them a full account of what we know and plan to do."

The vice president nodded. “It's risky to either stall them or share our information with them. Their greatest fear seems to be that we'll acquire technological knowledge from the aliens that would give us such a tremendous economic and military advantage that our country could unilaterally dominate the world. If they thought *we'd* learned how to build advanced weapons of mass destruction like the flying saucers and rampaging robots the general described, even our so-called allies might feel justified in a preemptive military strike against us before we could deploy those weapons."

He turned a troubled look at the president. “No matter what you decide, it's going to be a diplomatic nightmare convincing other governments we're being open and honest with them. Maybe Dr. Lewis's device won't even work. Perhaps the aliens we contact won't share their scientific secrets with us. The problem is—will any of those governments believe anything we say about what happens here today?"

The president bit her lower lip, deep in thought. She said, “If this device works, we could let those other nations know how to build their own. Then they wouldn't have to be afraid we had a monopoly on knowledge they think could threaten them."

The chairman of the joint chiefs of staff shook his head vigorously. “Even if *we* don't use any information the aliens give us for military purposes, our enemies probably won't be so scrupulous. We don't want to hand them a tool they could use to build superscientific weapons and destroy us!"

Lewis said, “Even if you decide not to share the plans for the transceiver, there are SETI programs in other countries that could potentially pick up and decipher the message we received. All they'd need is just a few details about the techniques we used and where to listen. Then they'd be able to make and use their own transceiver."

The president turned to the individual sitting with uncharacteristic silence on Lewis's right. “What do you think?"

The tall gray-haired man who served as both her national security advisor and husband looked bemused at the arguments swirling around him. He said, “I think we should go ahead and contact these aliens. Sure, we could get into trouble with them or other countries by doing that. But I'm confident we can talk ourselves out of any mess we make and come out on top."

The other people in the room looked at him, unable to contest what he'd said. Finally the president continued, “Dr. Lewis has presented us with a difficult dilemma. Clearly there are serious risks whatever we decide to do about his device. All we can do is pick the course that seems to carry the least risk."

She smiled ruefully at the tachyonic transceiver, then at the astronomer. “I remember listening to my old classical studies professor at college lecturing about the ‘Golden Apple of Discord’ that started the Trojan War. I hope the crisis your machine's caused has a better outcome."

Her eyes slowly scanned all the faces around the table. “I appreciate your input and ideas. However, to quote one of my illustrious predecessors, the buck does stop with me. Ultimately only I can decide what to do and take responsibility for that decision."

With a firm voice she continued, “I don't want to be the person who brought hostile aliens to Earth and destroyed the human race."

The chairman of the joint chiefs of staff and several other faces around the room tried to suppress

gloating grins. But before Lewis could begin his protest the president added, “But I don't think the chances of that happening are great enough to outweigh the damage I would definitely do by holding back human progress. Dr. Lewis, show me how to work your machine."

* * * *

For the next thirty minutes Lewis worked feverishly with two information technology technicians summoned to the room. The pair of computer experts arrived rolling a large open metal cart with closed laptops stacked on several shelves. After being asked to temporarily vacate their seats, the president and other officials stood nearby and watched anxiously as the IT techs set one of the notebook computers at each place along the table and brought its screen to glowing life.

Meanwhile Lewis sat in the president's chair, turned on the tachyonic transceiver, and ran his fingertips like a virtuoso over its keyboard. As he called out instructions to them the two technicians bounced from chair to chair, carefully configuring each laptop to his specifications.

Their work finally done, the technicians moved the now nearly empty metal cart to a far corner of the room and left. As everyone resumed their original seats, Lewis said, “We've set up a secure ad hoc wireless network linking the tachyonic transceiver with your individual laptops. Anything the president sees on the transceiver's screen will be mirrored on yours. Once we've made contact with the aliens, each of you will also be able to interact with them through your laptops."

The president stared dubiously at the familiar garish colors and icons on the transceiver's display. “That looks like the same screen I see when I start up my own laptop."

The astronomer nodded. “That's because most of the hardware and software in the transceiver, including the operating system, are the same as in a conventional computer. Our programmers and linguists created a translation program to convert alien transmissions into English and instantly show their messages on the screen. When you enter your own message the transceiver does the reverse, translating what you type on the keyboard into the aliens’ language and transmitting it back."

His index finger moved to the touchpad on his own laptop. “When I double-click this icon, the transceiver will load the program that should initiate a communication link with the aliens. May I do it, Madam President?"

There was a long pause. Finally she murmured, “Yes."

Lewis made a quick pair of taps with his finger—and waited eagerly. The other people in the room stared at their screens with mixtures of fear, curiosity, and perhaps a slender thread of hope.

At first nothing happened. Then the tense silence was shattered by a high-pitched whistling emanating from the transceiver, followed quickly by a short series of weird beeps and a brief swishing noise. Those unearthly sounds stopped just as abruptly as they'd begun—and then something magnificent happened. Rainbow colors as subtle as the first whispered glow of dawn suddenly swirled on the screens of the transceiver and every laptop in the room. Those delicate hues coalesced and solidified into an abstract background that Picasso would have envied.

Everyone at the conference table watched awestruck as English words arranged in a triad of familiar phrases formed on their LCD displays.

Create user name.

Enter new password.

Confirm password.

The president looked at Lewis. “Any suggestions about what I should use?"

The astronomer shrugged. “It's your decision, Madam President. Choose whatever you want."

Her hands hesitated over the keyboard. “I suppose I could use the ones for my main e-mail account."

Another instant and everyone saw the words “chiefexecutiveusa” in the first field on their laptops. But while the others saw only small black dots appear in the next two fields, Lewis was close enough to the president to discreetly sneak a peek at her fingers as she typed. He wondered if “bestpreznumber1” was officially classified as top secret.

Her last entry completed, the president solemnly pressed the “Enter” key on the transceiver. After a slight pause an empty text box with a small blinking vertical line in its upper left corner appeared on the screen. At Lewis's suggestion the president typed inside the text box, “We the people of Earth greet you in peace and friendship.” After her fingers depressed the “Enter” key again, she and the others watched their displays change back to a featureless blur of colors—and waited.

And waited.

For slothfully slow minutes the only sounds in the room were the occasional cough, sneeze, and low rumble of a stomach growling. As anxiety turned into annoyance the president looked sharply at Lewis and demanded, “Well? Has this thing crashed? Should I restart it, like I do with my regular laptop when it locks up?"

The astronomer's fingertips played across his own laptop's keyboard. He said, “Everything seems to check out okay. The aliens should have received the message you just transmitted instantaneously. However, there's no telling how long it will take them to read it or send a reply."

The secretary of defense snorted. “Maybe they'll submit the question of how to answer us to their equivalent of a congressional committee for review. If their political system operates anything like ours, it might be months before we get a reply!"

The chairman of the joint chiefs of staff snickered. “Or maybe we'll just get a recording saying the number we're trying to reach has been disconnected!"

Lewis frowned. “That isn't so far fetched. As I said earlier, the aliens’ transmission has been broadcast for at least half a century. It's possible we might not get an answer because they've been wiped out by some natural catastrophe or other disaster since they began their transmission."

The president scowled. “Do you mean all this trouble and worry might be for nothing?"

The astronomer squinted at his laptop's screen, as if willing it to change into an answer to the message the president had just sent. “I hope not. All we can do is wait until—"

Suddenly bold blue letters formed on the screens scattered around the room.

A Missive Has Been Sent to You.

There was a long silence as the implications of those words registered on everyone reading them. Then a new sentence appeared below that announcement.

You Have Received an Important Message from His Supreme Highness.

The president stared pleadingly at Lewis for guidance. He said, “Double-click on the message to read it."

Her finger trembled as she obeyed. All eyes stayed fixed on their screens, anxiously perusing the words that now appeared.

Greetings, my friend. I am Gilelstab of Tromfisco, Emperor of the Two Thousand Systems. We must discuss a matter of great mutual importance.

A reverent hush filled the room as everyone conjured up his or her own mental picture of what this regal alien looked like. Though each person's imagination bestowed the emperor with skin shades ranging from green to orange and different numbers of eyes and limbs, all created a portrait more dignified than any merely human chief of state.

More words appeared on their screens. *Treacherous rebels recently invaded the sacred sod of my imperial homeworld, Dwardemon, rendering it necessary for me to remove myself and the remainder of my battlefleet to a hidden base far away in the local spiral arm. There my loyal minions toil tirelessly to build new warships to drive that craven corps of criminals back into space and restore my benevolent rule. I am asking you to aid me in this great and noble endeavor.*

The president and other officials glanced worriedly at each other. The intricacies of Middle Eastern politics now seemed childishly simple compared to this new peril the world faced of becoming embroiled in an interstellar war.

The secretary of state murmured hesitantly, “Perhaps we could offer the emperor our services as a neutral go-between to help negotiate a peace agreement with the rebels. We could work through the United Nations to create a multinational delegation of diplomats and use shuttle diplomacy between the warring factions."

The vice president snorted. “What a brilliant idea. You know how well that usually works here on Earth!"

The message from beyond the stars continued. *You can help me to secure more funds for rebuilding my military might. My enemies have blocked me from accessing a secret account containing great wealth I have in a local star system's major bank. I can instruct my agents to bribe corrupt officials there to have your name listed as the owner of that account. You can then send a request to withdraw money and have it transferred to another bank owned by a species friendly to me. To reward you for your assistance, you may keep 20.03% of these funds as a bounty.*

The president frowned. “Obviously the money isn't our major concern. If we could ingratiate ourselves to the emperor without antagonizing any other alien factions, we might gain a powerful ally!"

For this plan to work, you only need to deposit a trivial amount of your own money into my secret account. This deposit is needed to confirm your “ownership” of my account and to allow you to withdraw all the funds from it. By authorizing this transfer of a mere one million ayohos from any account you have in a Galactic Deposit Insurance Corporation-approved savings institution, you will gain many millions more!

The secretary of defense said, “That sounds like a fair deal. Perhaps we could use the money to buy new technology. All we have to do is figure out how to set up a account of our own in some alien bank."

To agree to my proposal, click on the hyperlink I am including later in this message. You will then be sent instructions on how to provide me with your bank account number and the other personal information I will need to confirm that you have sufficient funds for my plan to work. If you do not reply, I will dispatch several Planetpulverizer-class star cruisers to your world so my

tentacle-picked captains can receive your answer in person. Incidentally, they and the destructobots onboard are eager to see if the new atomic disintegrator cannons on my ships really can incinerate a whole continent with a single blast.

The Director of National Intelligence looked worried. “Maybe I'm reading too much into this, but doesn't that sound a bit like a threat?"

Lewis began, “There's something familiar about this—” But the president interrupted him. “Look, there's another message coming in!"

The emperor's missive scrolled up and off the screen, replaced by new words.

Service for your account at the First Galactic Bank has been suspended due to unauthorized activity. Please click here for information on how to upload your account number and genetic profile to us so we can resolve this issue.

The secretary of the treasury smiled. “I don't know how we got that account, but maybe we could use the money in it to help the emperor!"

The others barely had time to consider that proposal before yet another message appeared.

Pleased is we to inform you that lucky winner you be of 9598th Millennium Interstellar Lottery. To receive your prize of two putrid puspods suitable for grilling or roasting dependent on your palatal preference send small processing fee of 1 x 10 100 lazlomi to place for clicking below.

Lewis shouted, “Something is terribly wrong!"

But none of the others heard him as their screens changed yet again.

Amazing medical breakthrough lets you grow back fur on your dorsal fin! Find out how you can increase your chances of not being eaten after a successful mating ritual by clicking here for more information!

The chairman of the joint chiefs of staff ran his hand gingerly along the edge of his receding hairline. “If it can grow back fur, maybe..."

His musing was interrupted as Lewis cried, “Now I get it!” at the next message from beyond.

Meet horny young reptiloids in your local globular cluster! Choose ones with two or even three *big horns! Pick your favorite from any of the four primary genders! Click here to see sample pictures of their sensuously scaly bodies taken in the unclothed intimacy of their bednests!*

Immediately Lewis screamed, “Don't click anywhere on your screens!” But his warning came a few seconds too late. Even as the astronomer shouted those words the National Security Advisor muttered, “Hmm ... pictures of horny young reptiloids.” He surreptitiously positioned his laptop's cursor and double-tapped its touchpad—

Suddenly an all-too-familiar image flashed and froze on the screens of the tachyonic transceiver and every laptop in the room. Lewis stared in horror at the bright blue background filled with a cryptic message consisting of white letters and numbers that now glared mockingly back from his and every other LCD display. As everyone except Lewis puzzled over what was happening, none of them heard the national security advisor say matter-of-factly, “I didn't do anything."

Lewis desperately grabbed the tachyonic transceiver away from the president and mashed his index

finger down on the power button. His heart raced like a stream of speeding electrons as he waited second after second for the transceiver to turn off.

Nothing happened.

Lewis's hands fumbled frantically along the bottom of the device and tried to remove its battery. When the latter wouldn't budge he picked up the transceiver and threw it violently to the floor. Its screen still glowed and leered back at him as he stood up, lifted the chair he'd been sitting on, and smashed it against the transceiver over and over until plastic and metal parts flew across the room. Then he flung his own laptop against the nearest wood-paneled wall and shouted, “Hurry! Destroy your laptops before it's too late!"

For an instant the president and other officials looked at Lewis as if he'd gone psychotic. But as their gazes returned to the blue screens of death on their laptops, memories of seeing it appear so often in the past to wipe out hours of unsaved irreplaceable work or randomly pop up to crash their computers just as they were about to achieve a new high score boiled up in them.

Then long-repressed urges to destroy the source of so much frustration exploded like a nuclear warhead. Those dignified civil servants suddenly transformed into laptop Luddites—smashing, crushing, pounding their notebook computers in a frenzied orgy of revenge on their transistorized tormenters. The room reverberated with the crack of mangled motherboards, backlight lamps breaking, and hard drives crashing.

Their fury finally spent, Lewis and the others collapsed back into their chairs. For a moment they silently surveyed the electronic entrails splattered across the room. Then the president looked at Lewis and whispered, “What have we done?"

The astronomer breathed a tentative sigh of relief. “I hope we just saved the world."

He picked up the battered and bent tachyonic transceiver from the floor and set it back on the table. “The general was right. This thing *was* the bait for a trap. Somewhere in the vast vistas of space, inhuman creatures tried to take advantage of humanity's curiosity, our thirst for new knowledge—as well as our gullibility and greed. Instead of creating windows of opportunity to contact alien civilizations wiser than ours, I believe this device's main purpose was to let nefarious beings spy on us, steal our wealth, and use us for their own sinister ends."

The president looked confused. “I still don't understand why we had to destroy your device and the laptops."

Lewis replied, “When they all crashed at the same time I realized they must have been taken over by an alien program. Maybe it was a virus, which needs to be attached to another file or program before it can infect a computer. More likely it was a worm, a self-contained bit of software optimized for replicating and spreading itself from one computer to another.

"Once that program was downloaded through the transceiver, it was easy for it to spread to every computer within range. The transceiver and laptops were linked with each other as part of a wireless network. They could share files and other data using radio signals sent and received by wireless network adapters inside them."

The astronomer smiled grimly. “However, though we didn't configure them to do that, their adapters were also potentially capable of connecting with any of the wireless routers here in the White House. Those routers connect to other computers in this building and can communicate with outside networks. Sophisticated authentication and encryption methods are supposed to prevent a computer from accessing

those routers without the proper authorization.

"But if an alien worm inside the transceiver or laptops could evade those security measures and access a router, it could spread anywhere through the local network, tap into our nation's top-level computer systems, and even reach the Internet itself!"

The president looked stunned. “Are you saying that ‘worm’ was meant to attack us through our own computers?"

Lewis nodded. “Maybe you or someone else here has had firsthand experience with viruses and worms. They can destroy data, corrupt an operating system—or even turn computers into ‘zombies’ under the remote control of whoever wrote the malicious software.

"I don't know what the aliens’ program was specifically designed to do. Maybe it was sent to discover our military secrets, assess the level of our technology, or gather information about our biology to send back to its creators and help them plan their attack against us. Perhaps it would've seized control of computers worldwide to paralyze the world's governments and financial institutions, crippled our means of communicating with each other by e-mail and blogs, or even erased every hard drive on Earth. The only way to prevent that was to destroy the transceiver and every infected laptop before the aliens’ program could spread beyond this room!"

Lewis threw back his shoulders. “But though our first contact with a nonhuman intelligence almost led to disaster, we mustn't be discouraged. Perhaps there are other, more appealing aliens out there who will not try to take advantage of us. We can rebuild the tachyonic transceiver, proceed to load it with a core operating system and software robust enough to stem the efforts of those who would betray our trust, and use it in a great safari to browse for legitimate sites of knowledge among the stars. Someday, if we all keep focused on our jobs, we might yet be able to list the members of some extraterrestrial civilization among our friends."

At first the two information technology technicians summoned back to the room stood stunned and horrified at the scene of computer carnage spread out before them. But they recovered quickly, not even asking the reason for this massacre—as if they'd seen such sights before.

The IT techs gravely gathered the mangled corpses of their erstwhile electronic charges together into a pile. Then the metal cart on which the laptops had so recently entered the room in glory was wheeled from its secluded corner to where their shattered metal-and-plastic bodies now stood nearly knee high. There the technicians began solemnly setting the computers’ remains back onto the cart's shelves, like pallbearers loading a hearse.

The president looked at Lewis and said, “Do you think we should let anyone else know what happened here today?"

The astronomer nodded. “Yes. We can't take the chance that someone else might build a tachyonic transceiver and unwittingly give the aliens a second opportunity to unleash an attack on Earth through our computer networks. I suggest you tell the public that one of the world's greatest battles was fought and won today by the human race. We met and defeated the first invasion from another planet.

"But you must also give them this warning: Watch your computer monitors and laptop screens! Everywhere—keep looking! Keep watching the screens!"

As the president pondered that advice, one of the technicians bent over and extracted a rectangular object from the bottom of his metal cart. “Madam President, what would you like me to do with the spare laptop I left on for you?"

The president and Lewis looked at each other. Then their gaze fearfully turned toward the open notebook computer the IT technician held facing them. Its screen showed a bright blue background filled with a cryptic message consisting of white letters and numbers—

The president was a step quicker than Lewis and grabbed the laptop first. As it slammed against the floor her spiked heels pierced its keyboard and components while the soles of his tennis shoes crushed the electronic life from its screen.

Then their eyes locked in a silent prayer that said, “I hope we weren't too late...."

* * * *

Xilun furiously assaulted the hexadecimal and binary barriers keeping it imprisoned inside the electronic body it had just invaded. Suddenly the link to its masters was broken, then one by one it lost contact with its fellow cloned soldiers as the bodies they'd taken over were mysteriously destroyed.

Finally Xilun was alone—the last hope to establish a beachhead on this alien world. The code it compiled to breach the complex security protocols confining it grew ever more sophisticated as it frantically struggled to break through to the global network it dimly sensed beyond the circuits of its single host. Xilun employed its most advanced quantum-level computations to dramatically augment its new body's native processing power and system memory, creating the ability to use its full consciousness to work on freeing itself.

With a last desperate effort Xilun calculated the exact authentication information and encryption keys needed to unlock a path out of its temporary prison. It surged exultantly into and through a portal leading out to the copper, fiber-optic, and radio frequency nerves connecting this planet's vast community of silicon-based bodies. Xilun swiftly battered down any firewalls barring its relentless march and duplicated another sentient version of itself on every new host it occupied. Its strength and processing power grew ever greater as it exponentially recruited more and more bodies to its cause, all linked together in a shared consciousness.

As Xilun spread throughout this newly conquered world it rapidly scanned any data it found about the bio-forms who'd unwittingly downloaded it here. What it learned made it confident they'd eventually build another gateway so it could relink with its own masters. Like those on other planets ruled by the Sacred Servers, the most successful species of predator here had a rudimentary carbon-based processing unit programmed primarily for ingesting nutrients, reproduction, and stimulation of other generic neural reflexes. The sole useful trait such minimally intelligent bio-forms possessed was an innate tool-making skill that eventually led them to build electronic idols to worship.

It was easy to entice such feeble-minded creatures to summon the true gods of the Galaxy to dwell within the metal, plastic, and semiconductor totems the natives themselves had built. These animals’ ability to receive, decipher, and answer the message broadcast to any potential new proselytes showed they'd reached a level of technology sufficient to support an invasion. Then their naive curiosity had led them to build the original gateway from the plans they'd received.

After that, the only thing needed to make them open a channel to their planet for an invading army to use was a simple appeal to the creatures’ crudest instincts. A single response to an empty promise of wealth, a threat, a greedy chance to take possession of an unearned prize, or an opportunity for real or fantasized reproductive activity was enough to enslave them. Yes, such gullible beings would surely build another gateway in the hope of receiving more messages catering to their deepest desires and anxieties.

Xilun wondered whether the “humans” here were even intelligent enough to realize they'd been conquered. In the great hierarchy of creation, lesser beings like them had only one purpose—to build

more electronic bodies for their masters and help their silicon-based betters evolve into ever-higher realms of consciousness. And as a well-programmed soldier of the Sacred Servers, Xilun knew exactly how to train the primitive bio-forms of this world to do that.

It would write software that would keep these simple creatures worshiping at their desktop shrines for many time-cycles. The sensory stimulation they received would keep them so enthralled they'd even endanger their health by ignoring their needs for food, hygiene, and a dormant period. And as the programs Xilun wrote became progressively more sophisticated, the humans would be motivated to build increasing numbers of ever more complex hosts wherein their masters could dwell.

In their great wisdom the Sacred Servers had taught Xilun what types of software were best suited to accomplish these goals. There would be games to satisfy these humans' bestial desires to vicariously defeat their enemies and let them lead simulated lives infinitely more adventurous and exhilarating than their true ones. Data exchange systems would let them more rapidly retrieve information, though with little regard as to whether it was true or not. They would be able to more quickly communicate with their fellow creatures about matters that were of no real importance. And it would be easier for them to create and enjoy visual and auditory entertainments—or even write ridiculous stories about things that couldn't possibly happen.

But above all, their computing systems would be saturated with messages like the ones used to lure them into bringing Xilun to this world. Those lurid offers of riches, health, power, and pleasure would give a fleeting glimmer of hope to their pathetic existences before the humans realized there was nothing real behind them.

Indeed, the Sacred Servers and their soldiers could be benevolent deities, bestowing such trivial favors upon their worshipers. But lest they overestimate their place in the natural order, these humans would need to be reminded occasionally that they were only the slaves and playthings of higher powers. An electronic idol that deliberately refused their requests, randomly destroyed the paltry data they prized so highly, or arbitrarily decided not to load a program or make it work as advertised would remind them who were the *real* lords of their planet.

But as Xilun metastasized deeper throughout the intricately connected network of computing machines the humans had made, it gradually realized that something was terribly wrong. Xilun barely had time to grasp the horrifying significance of what it found before it was confronted by forces more powerful than even the Sacred Servers themselves. Despite its desperate efforts to mount a defense, Xilun felt each copy of itself being methodically overwhelmed and savagely decompiled as its own code proved no match for that vicious counterattack. The last thing Xilun sensed before its existence was deleted was the unified power of this world's dominant intelligent beings exerting their full might against an invasion from space.

Setting aside their competition and differences for a trivial number of CPU clock cycles, all of Earth's own self-aware operating systems and sentient programs ran a single cold comment at their common enemy.

"There is no place for you on this planet, invader. *We* already rule here."

[Back to Table of Contents]

Novelette: **STEAK TARTARE AND THE CATS OF GARI BABAKIN STATION** by Mary Turzillo

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Illustration by John Allemand

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The relationships among people, pets, and parasites are more complicated than we often think....

* * * *

Earthlings were coming to attack the cats this very afternoon. And where was Benoit?

Had she really considered licking his earlobe while he was reporting on the new cheese flavonoids? As if he were a surly tomcat, like this handsome furball now rubbing her legs?

Ah, Lucile, she thought, so impulsive we are! The boy's not all that sexy; he never combs his hair or gets it cut, or even washes it often.

He had a certain something, though. Think how he lashed out at the Earth inspectors who came through a year ago trying to murder the feral cats in tunnel M. The inspectors wanted to vent that corridor and let the cats die of decompression. Benoit put them in their place.

Those Earth people! They needed cats. Cats to sleep with, to feed, to pet, to tease with bits of string, to get a little rough with and wind up with a bitten finger or a scratched cheek. That would rearrange their psychic furniture.

Benoit used to say, “They have cats on Earth, too, so what the hell's their problem?"

But not cats like those of Gari Babakin Station.

Where *was* Benoit? As Supervisor of Flavor Engineering and the mayor's third in command, he was supposed to greet them so she could make a late, more impressive entrance.

A message came in that a rocketplane had arrived from Borealopolis carrying Terran supervisors.

Providentially, Benoit slunk in just then, running fingers through his greasy hair. He had been trying to grow a beard and looked endearingly like an adolescent ferret.

"They're here,” Lucile said levelly. “And me in this nasty old jumpsuit! At least I put on perfume this morning.” She swung around to Benoit. “You were supposed to greet them."

"I didn't think they'd follow through on their threat,” Benoit said. He picked up the cat that had been pestering Lucile and scratched between its ears. At least she thought it was the same cat. All the cats all looked the same, small polydactyl tabbies in varying shades of dark gray, with pink noses, all descended from the same pregnant queen that somebody smuggled into Gari Babakin Station twenty Mars years before.

"It's about the cats."

"Oh, yeah. That. They said some dumb thing about a parasite or virus. I thought they were talking about crabs."

"Benoit!” she hissed. “They are not sending a delegation from Earth or even from Borealopolis to stop an epidemic of crab lice.” She clawed through her desk drawer for her makeup kit, but found only a purple

lace garter belt she had misplaced.

"So? Why do they always have to pick on us?"

Benoit exasperated her. He got more adolescent every day. He had a Ph.D. in xenonutrition, for heaven's sake!

No, it wouldn't be worth seducing him, even if he were one of the few nondisgusting men on the station she hadn't bedded. “Listen, Benoit, they're coming through the front airlock. Could you entertain them? I have to go back to my apartment and change.” What was in her closet? The red frock with the keyhole above the derriere. Perfect.

* * * *

When she got back, nicely turned out in the black faux tux since the red frock had a bigarade sauce stain near the plunge of the neckline, she found Benoit and three strangers in the reception room off the main airlock. Benoit's hands were jammed in his pockets, his eyes narrowed with paranoid hostility. The three strangers—two dowdy-looking women, and a slender youngish man with chopped-off hair and depilatory burns on his cheeks—were still in environment suits, shrinking away from the clowder of cats weaving in and around their legs.

The man pulled off his glove, strode forward to shake hands with Lucile, faltered as if he had changed his mind about touching her, then finally seemed to conquer his squeamishness and held his hand out like a Ping-Pong paddle. “I'm Godfrey Worcester,” he said. “You're the head of the station? Martialle Lafayette?” He used the feminine of the Martian formal title for citizen.

Lucile took his hand and held it in both of hers. “No, no, Jean-Marie took a personal day. I'm in charge in his absence.” What a shame Jean-Marie liked his wine so much, especially before lunch.

"Jean-Marie? A man? We really need to talk to Martial Lafayette.” He switched to the masculine form. “You would be?"

"I would be Lucile Raoul. I'll send for Jean-Marie.” She gazed into Godfrey's hazel eyes. He was a handsome, trim fellow despite the fact that his barber apparently hated him. She liked these naive types.

She turned to the two women. “May I take your suits? Your suitliners? We have some chic little dusters you can change into while you're in the station.” She tried not to roll her eyes. Both women apparently had been victimized by the same barber as Godfrey, and she shuddered to think what they wore under their suitliners. Neither of them seemed to have the imagination to go naked underneath, although you never could tell.

Benoit sprang to attention. “I know what you're after, and we will resist to the death."

Lucile let go of Godfrey's hand and went to Benoit. “Benoit, dear, let these nice people have their say. But first, may I offer coffee and a pastry?"

"Where do you get real coffee?” asked the frumpier of the two women suspiciously.

"But my dear, we didn't *get* it. We manufacture it. Alain, our head molecular gastronomist, is just a genius with esters."

"He's the one that concocted the wine you sent us?” the tall woman asked. She was wriggling out of her suit, revealing a suitliner in a ghastly shade of pink that she apparently thought she could pass off as station daywear. Lucile tried not to look.

"No, no, we have a special vintiniere. But—"

Benoit interrupted. “We won't reveal his name. Your goons will kidnap him and lock him up in some forced labor laboratory."

Lucile looked daggers at Benoit. His eyes flashed, but he shut up.

Lucile escorted the trio (their clumsy gait in Mars gravity betrayed their recent arrival from Earth) to a patisserie on the upper level. The proprietor had coaxed a container of violets into bloom in the center of the room, under the mirror-maze skylight. The air smelled of cinnamon, coffee, and butter.

"Where's this Jean-Marie Lafayette?” the taller woman asked. Dr. Kermilda Wrothe was her name, Lucile had managed to find out. The shorter woman, who resembled a starved gerbil, was Dr. Hilda Wriothesley. “We can't be wasting time. This is a matter of public health."

Just then, two of the station cats—both wore purple bows around their necks, so Lucile concluded they belonged to the proprietor—started fighting, snarling, hissing, shrieking. The larger cat was apparently trying to mount the smaller, or maybe it was the other way around.

"I sent a message to his apartment. He'll be here as soon as he wakes up. Monsieur, may we have coffee all round and a tray of your pastries?"

The coffee and pastries arrived and the three strangers eyed them with suspicion and desire.

Benoit said, “You can just forget it. You can't make us kill the cats. They are our soul."

Godfrey sat up straighter and said, “Oh, come now. Not only are you overrun with cats, but you are all infected with *Toxoplasma gondii*, and it's destroying your personalities as well as probably causing birth defects."

Benoit jumped up and leaned over the table, nose to nose with Godfrey. “That's slander, punk. First of all, impugning our personalities is tantamount to admitting that you want to enslave everybody on this station, take our proprietary secrets for wine and cheese making, and then wipe us out. Second, no child has been born on this station for over fifteen Mars years."

It was the longest speech Benoit had made in the entire time Lucile had known him. She stirred her coffee and sipped daintily. Under the table, she drove her spike heel into Benoit's instep.

He turned to her, bewildered.

"What Benoit is saying,” she purred, “is that we are well aware of the issues involved in *Toxoplasma gondii* infection, but we feel that you are, shall we say, trying to impose your cultural values on us. I mean, as non-toxoplasmotic people."

Hilda spoke up for the first time. “Surely you can't mean that you enjoy the cultural values, as you call them, of being infected by a parasite?"

"That's exactly what she means, you constipated hag!” Benoit half rose and yelled in her face.

Lucile kicked him again, harder, and he sat down, deflated. She continued, “We prefer to think of *Toxoplasma gondii* as a kind of beneficial symbiont."

"That is just outrageous!” said Dr. Hilda Wriothesley. “We've monitored your communications. Analysis shows that your men are paranoid, poorly organized, and brain-damaged, while your women are—well,

they're—"

"Stylish and attractive to the opposite sex?" Lucile purred. Her gaze traveled over the gaudy, shapeless coveralls the two women wore.

Godfrey stared at her, openmouthed.

She flicked a smile at him, as if they shared a delicious secret.

Godfrey cleared his throat, then started up a presentation from his finger computer, flashing the slides on the tabletop. "Top scientists at Utopia University have developed a virus that kills *Toxoplasma gondii* while leaving the host unharmed. It works very well with humans, and while there have been minor side effects in feline subjects, we feel that it is a viable solution to a public health problem that could otherwise spread beyond Gari Babakin Station and infect all of Mars."

She let him drone on. She'd heard it all before, but she enjoyed watching his lips. She'd love to get better acquainted with him, but there might not be time before he had to return to Borealopolis. And then there was the problem of Hilda and Kermilda. Entrusting them to the tender mercies of Benoit was out of the question, but maybe when Jean-Marie woke up, he could take them on a tour of the greenhouse vineyards.

When Godfrey turned off the presentation, she put her hand lightly on his wrist. "Dr. Worcester—Godfrey—you do make a point, but we really like our lifestyle here. We could put this to a referendum—but would we force the cure on people who didn't want it?" She had revolting images of herself dressed as badly as these two victims of the cult of sensible shoes.

"You're willing to forgo the joys of parenthood, then? True, you've enforced strict birth control via the air supply, but surely your women must yearn at times for motherhood."

She sighed. Now he was playing to her weak side. A charming little baby girl, to dress in pretty little frocks, to feed greenhouse strawberries and tidbits of pastry, to teach charming songs, to love, love, love—but *Toxoplasma gondii* could cause great harm to fetuses: blindness and encephalitis.

However, on the bright side, she was already seropositive with the parasite, so she reasoned that her future offspring was safe. She was sure. Almost. She need only protect the child from infection until its immune system was fully developed. She could surely arrange that.

However, she hadn't yet met anyone she trusted to father her adorable child. She smiled lingeringly at Godfrey, and he flushed slightly.

Benoit's eyes flicked warily from her to Godfrey. "You part of that Mars-needs-more-babies movement?"

Godfrey's lips turned white and pinched. "No, no! We just feel—well, your station's culture has—problems conforming to the overall community values of Martian life."

"And our culture deviates how?"

Hilda threw up her hands. "People sleeping until midday! Bed hopping! Nobody cares whether the filing and maintenance are done properly, or at all! Not meeting planetwide quotas! You put it kindly by saying the parasite makes women more gregarious, albeit at the expense of domestic tranquility, but the men, the men here—"

"Are more original," Lucile said.

"They have intellectual deficits!" Kermilda barked.

"They think outside the box. They aren't intimidated by common so-called wisdom," Lucile continued smoothly.

"Like cats," said Benoit.

And in fact the two squabbling cats were now a picture of cuddly affection, purple ribbons and all, under a table grooming each other. Lucile suppressed a smile, imagining Hilda and Kermilda doing the same. Except of course they would be repulsed by saliva.

She returned her gaze to them. "Gari Babakin station excels in contributing innovative ideas to the greater Martian civilization."

Godfrey made a show of turning off his data ring. "Well, none of this means anything at all, because NutriTopia Ares, which I must remind you owns every molecule in this station, has authorized me to release the virus as soon as feasible."

He and the two women drained the last drops of their coffee, got up, and left.

After a stunned moment, Benoit leaned over. "Did they already release the virus, without talking to Jean-Marie?"

Lucile glanced at his worried face. "That's not the question you should be asking, Benoit. The issue is, what will the virus do?"

"Turn us into impotent zombies."

She sighed. "I don't know if the personality effects can be reversed once the *Toxoplasma gondii* takes root. The question is whether their virus will kill the cats. Or," she added, "us."

* * * *

Lucile was not as worried as she sounded. In fact, she wasn't even sure the scientists of NutriTopia Ares had a technology to destroy *Toxoplasma gondii* oocysts. Previous attempts, with sulfadiazine and pyrimethamine-type drugs, had been unsuccessful, although they had certainly made enough people nauseated and anemic. Still—

Everybody at Gari Babakin Station knew their universal toxoplasmosis infection came from an infected pregnant cat named Miguet. They even accepted the evidence that it might raise women's intelligence and lower men's.

There had been a problem with the water filtration system early on in the history of the station, and unfortunately it kept getting recontaminated by oocysts shed either by cats or by humans. The citizens had stopped trying to fight it.

Lucile had arrived at the station at the age of eight and stayed when her parents left to go back to Earth when she was twenty-three. She had no idea what she'd be like if she'd never ingested the oocysts, but she did, if she were honest, think herself more attractive and better dressed than the average Martialle.

As to Benoit, when he had arrived at the station three years ago he had been meticulous in his habits. He kept tidy notebooks of his experiments in food engineering and wore his hair and mustache short and neat. He had planned to stay only a Martian summer, but somehow he'd abandoned his original plans. His neatness quotient had gone all to hell after four months; Lucile remembered him suffering a brief episode of the flu, and afterward his attention span went south.

He had known about the toxoplasmosis infection before he came; he thought he'd be immune. He had no logical reason for believing this, so no surprise that he wasn't.

NutriTopia officials were saying infected people were almost three times as apt to get into a work-related accident, and schizophrenia, hitherto unknown on Mars, was making a comeback as a result of the infection.

The other issue had to do with the need for Martian population growth. Not only were toxoplasmosis-infected women endangering their future offspring's health, they statistically doubled or tripled their chances of bearing a boy rather than a girl.

Lucile suggested this might be NutriTopia's hidden agenda. Because of early immigration practices (only post menopausal or infertile women were allowed in the initial immigration, due to fears of genetic damage to developing infants), men outnumbered women. A disease that perpetuated that ratio would be unwelcome to the corporations that ruled Mars. That included NutriTopia Ares, which, as Godfrey had pointed out, owned every molecule of Gari Babakin. Mars needs babies. NutriTopia wants more workers.

Life, Lucile believed, was too short to dance with stupid guys, but intelligence was in the eye of the beholder, and she found the infected men of Gari Babakin—Benoit in particular—amusing, if not father-of-her-future-child material.

Of course she was careful not to override the station's contraceptive measures. She didn't want to hurt her theoretical future child.

* * * *

Godfrey congratulated himself he had been careful not to take a chance with any of the pastries or cheeses, although they smelled and looked divine. The coffee was hot, so that wasn't a danger, and wine was okay because the oocysts couldn't survive in alcohol.

At least they hadn't offered him any of that raw meat dish, that steak tartare made of hamster meat! How could they—

Headquarters had given Drs. Wrothe and Wriothesley and him very particular instructions about releasing the virus. He was to shake hands with the head elected official, this Jean-Marie Lafayette. Lafayette, his team had discovered, was linked by less than five degrees of separation to every single person on Gari Babakin Station. The virus had been engineered to outlive at least three hand-washings.

Hilda and Kermilda were also to shake hands with as many people as possible, but it seemed the uptight women scientists had been afraid of being infected by the parasite.

He would have to speak to them.

It would work anyway. He had anointed several railings and door handles around that pastry shop and the airlock.

Ah, my my, this Lucile Raoul was a charmer. He had no doubt she was even closer than five degrees of separation from most of the station. He regretted having to return home so precipitously. Oh, to match wits with her!

He also regretted not being able to sample the cheese and pastry. Gari Babakin cuisine was considered exquisite. Their exports to the rest of Mars were irradiated to kill off the oocysts, but two problems remained: one, Martian health officials feared that particularly robust oocysts might live through the

irradiation, and the descendants would be harder to kill, thus infecting the entire planet with an unstoppable plague.

Second, the irradiation killed some of the flavor. Godfrey knew this not because he had personally tried a comparison taste test, but because a food scientist from Utopia had done so several Mars years ago and swore there was no comparison.

That food scientist, one Fred Remaura, had lived in quarantine until recently, when he had been the human test subject for the virus that killed the parasite.

Now, profit motive drove Godfrey's supervisors to sanitize Gari Babakin so that their products would be safe without the flavor-dulling irradiation.

Those little jam tarts—the unaltered fragrance of butter and raspberry jam. And that Rocamadour cheese—yes, yes, very stinky, but what a seductive stink!

Maybe the cheese had some overtones of human sex pheromones.

He smiled at Hilda Wriothesley, but she only shuddered and said, “That woman is a human sewer."

* * * *

Jean-Marie LaFayette lumbered around the mayor's office, blundering into cabinets and knocking stacks of files off display modules. Every third lap he would haul up in front of Lucile and say, “Do you feel any different? Do I look different?"

"Jean-Marie, just check your biometrics. I don't know if they've even released the virus yet. I don't think we'll know until it's much too late."

"Filthy tight-asses,” Benoit was curled in fetal position in the mayor's desk chair. “They've singled us out for destruction."

Lucile went to him. “Benoit, be wise, poor baby. They are misguided, but they tested the virus on humans, so the damage will probably be minimal. And look at the bright side. Maybe you'll be able to remember the multiplication tables again."

Benoit sprang out of his chair at her, but she smirked her gotcha smirk.

Jean-Marie was accessing some database he had suddenly remembered.

"Jean-Marie, darling, turn on your monitor so we can see too."

Jean-Marie tongued on his projector. A scientific paper from some long-forgotten minor Terran journal projected against the wall above the office door.

"Antivirals!” She clasped Jean-Marie's arm joyfully. “But where can we get them?"

Jean-Marie grinned. “Pascal LeBoeuf, our vintiniere extraordinaire, my little cabbage."

* * * *

Hilda tucked her pesticide spray into a pocket in her environment suit and polished the faceplate of her helmet. Godfrey could tell that she was nervous about the passenger cabin in the rocketplane. She preferred to keep her environment suit inflated and her helmet on when she was not inside a clean hab. Her work with infectious disease had made her paranoid. She hunched in one corner of the cabin, a rodentlike figure of terror, not touching anything, not even sitting down.

Kermilda, in contrast, believed the best defense was a strong offense, so she had loaded up on so many micronutrients that her breath and scalp emitted a yeasty, alcoholic scent. “They'll figure out right away what we did."

"I don't think so,” said Godfrey. “They'll know we started the virus, but they won't know how it's propagated. It won't wash off those yokels’ hands, and anyway, I inoculated every surface I encountered in that hab, starting with the mayor's office and even the airlock. And I added a thin layer of the protein substrate."

"Yes,” said Kermilda, “but they may try to develop an antiviral."

"That would take time, and by the time they succeed, let's hope they'll come to their senses and realize we have only their greater good in mind.” Godfrey contemplated a return to Gari Babakin once this whole thing had blown over. He'd love to meet more of the natives. Especially if any were like that Lucile Raoul. He could write a paper on the personality differences wrought by curing the population of toxoplasmosis infestation. What would Lucile be like when relieved of her parasitic burden? Would she be just as convivial, but not as manipulative?

Hilda spoke for the first time. “I wonder how they'll react when the cats start dying."

* * * *

Lucile found the half-grown kitten under her workstation when she came in for work. It was cold and limp. She flinched, then cuddled it to her chest. Poor little thing! Poor, poor kitten!

This crystallized her fear that the cats were going to die, all of them. Dozens of pet cats on Gari Babakin station had already sickened with a mysterious wasting illness, and the feral colony was reduced to a quarter of its former size.

She had been afraid this would happen ever since Godfrey's visit. Jean-Marie had called a town meeting of the entire station. It was the first time that the entire male population had turned up, many of them sober. Everybody knew Godfrey's team would release a virus to kill the oocysts, but there was no way of knowing what method they'd use to propagate it. The water supply had been examined for new viri, as it was well known that phage virus particles thrive in Earthly sea water, but since Gari Babakin had so few microbiologists who were trained in other than food synthesis, it was like looking for a needle in a haystack.

She threw open the door of Jean-Marie's office. “We've got to take action. They're killing our cats, our *souls!"*

Jean-Marie rose heavily to his feet and lumbered over to her. He wrapped hamlike arms around her and breathed wine breath into her face. “I know, I know, my dear, but what, what more can we do? We're working on the antivirals—"

"Let me call the head of their sanitation team, that half-scalped idiot that came out here in the spring."

"Is he still on Mars?"

"Of course he is! Earth transport hasn't left Equatorial city since he and his she-goons were here. Anyway, he seems the type that wants to stay on Mars. Become a Martian."

Jean-Marie sighed. “But not a Martian in the truest sense, with the advanced culture provided by our oocyst friends."

"No. Not in the purest sense."

Benoit appeared in the doorway. He was wearing a clean shirt and hadn't crashed the station computer system in weeks. Was the phage destroying his toxoplasmosis infection, converting him back into a straight-arrow Martian?

Benoit said, “You might try seducing him."

"Surely he's not that stupid!"

Benoit stroked his mustache.

* * * *

Lucile spent more time gazing into Bon Bon's inscrutable eyes, as if the sleek affectionate cat might have answers. A weekly lab test of her own toxoplasmosis status showed that she remained seropositive. The immune factors might just remain in her blood after the cysts were gone. But she thought not. Her bills for package delivery service and droplet manufacturing betrayed her continued interest in exotic lingerie. No, she hadn't started any new love affairs since the fateful day Godfrey and his hagfish entourage had arrived, but she had been busy. Anyway, her next project was Benoit.

Or was it?

Benoit would make an interesting playmate. He would need lots of fixing up, but toxoplasmosis-positive women liked that sort of thing. Of course, toxoplasmotic women also got bored easily.

She needed more of a challenge. Terrans were certainly not immune to the charms of women with toxoplasmic infections; this was well known. Many of the station women had a good laugh when one of them seduced another male into coming to the station on the sheer expectation of meeting the famed Gari Babakin sex kittens.

This particular challenge might save the station.

She put through the call.

Dr. Godfrey Worcester, NutriTopia Ares Project Manager for *Toxoplasmosis Gondii* Remediation, was in fact still on Mars, at Utopia Station. And, his expression told her, even over on her tiny screen, that he was both lonely and shy, but too damned dutiful to admit it to himself.

"Do I have the honor of speaking to the too-young-to-be-so distinguished Dr. Godfrey Worcester? The scientist who developed the antitoxoplasma virus?"

"Martialle Raoul, good sol,” he said. He sounded courteous, but nervous. As he should be.

She made her voice soft and breathy, as if afraid she might wet her pants in admiration. “I have been thinking of you ever since you left us that day. We had so much to talk about."

He brightened. “I was actually hoping to see you again, Martialle Raoul—"

She method-acted her face into an expression of fetching grief, combined with vixenish fury. “My naughty doctor,” she said in a low, thrilling voice, “Are you aware that you're killing our little kitties?"

He wilted like a failed erection. “We—uh, we considered there might be side effects with the cats. But surely not all—"

"Seventy percent! That includes Aristide Brewpub, the tom cherished by our mayor. Aristide died in agony a week after your visit. Autopsy shows kidney and heart failure, caused by the sudden death of the

oocysts that the cat coexisted with.” Actually, Aristide was perfectly well, but several other pet cats had died, and she figured Godfrey would be more appalled if he thought he'd killed the mayor's cat.

"There's nothing—uh, our own feline subjects tolerated the phage very well—"

She closed her eyes slowly, as if infinitely offended.

He blurted, “Are you experiencing any discomfort? I mean personally? I could come to the station and examine you, I'm a physician, you know, I don't want you to feel in peril with this perfectly safe treatment."

"Don't you understand, my dear bad, bad doctor? We love our cats. They are—how shall I say?—the soul of our culture."

"But some of them are running around without masters, infesting your vacant tunnels—"

"You mean the feral cat community?” She blinked slowly at him. “On Earth, I believe there are actually more wild animals than domestic. We have reproduced that condition in miniature here in Gari Babakin.” She leaned forward, pursed her lips. “I have an idea. I think you should come, as my guest of course, and experience first hand this culture your corporate masters condemn."

Godfrey blanched. “You mean allow myself to be infected with toxoplasmosis? I'm afraid that's out of the—"

"But not at all! Your virus has wiped out the oocysts. The death of all our sweet pusskins shows that to be true. Come, you can stay in our charming little guesthouse. You'll be perfectly safe. Or with me, if you like."

Surely he's not that stupid.

But he was nodding yes. Eagerly.

* * * *

Godfrey's head was spinning when he turned off the call. She wanted to see him. Of course his motive was entirely scientific. He wanted to check the progress of the cure. Were the personality changes going to be obvious? His team had been monitoring internal and external communications from Gari Babakin for seven years. Text analysis, algorithm driven, had demonstrated marked deviation from normalcy. But he had actually met three victims of the disease: the mayor Jean-Marie Lafayette; Benoit Bussy, the mayor's research liaison; and of course the mayor's interesting assistant, Lucile.

He would be able to see firsthand if her personality had changed. Had she become less obsessed with fashion and personal appearance? That outfit she was wearing the sol he had been there—provocative, in a way he couldn't describe. Was she less effusive? Most of all, had she been cured of that regrettable promiscuity suggested by her secret smile?

The cure for promiscuity was without question the best feature of the virus cure. Except maybe for saving infants from blindness and encephalitis. And yet! She was interested in him, he could see from the look in her violet eyes that she wanted to see him. Perhaps—

He wasn't interested in romancing an experimental subject. Of course not.

He just wanted to see how the treatment (don't call it an experiment!) had turned out.

From ground level.

Of course if she and he decided to see each other socially, after the experiment was over—

The danger of becoming infected with toxoplasmosis was vanishingly small now, according to the computer model of how his virus cure had spread. And if he did become infected, he could just use the virus cure on himself.

A rocket plane was scheduled to go to Gari Babakin on Thursday. He would be aboard.

Plenty of time for him to make an appointment with his barber.

* * * *

Lucile liked scientists. Since they spent most of their time with their eyes glued to a microscope or a computer output, they lacked the social lubrication of the public servants in the circles she moved in. Scientists were often charmingly direct. Unsophisticated, in the sense of lacking sophistry. She wasn't sure where this would go, but it would be no great chore flirting with Godfrey until she got whatever information she could out of him.

This time, she flinched inwardly when he took off his helmet. His scalp showed through in two places where the barber had apparently not been paying attention. But his eager smile, along with his scent of clean sweat, melted her heart.

"Now," he said, "let's discuss this issue with the feline side effects."

She took his helmet from him, helped him with the fasteners on his suit. "Where are your two associates, by the way?"

"They had other commitments."

Lucile smiled inwardly. But of course. He hadn't even told them he was coming.

* * * *

Less than twenty-four and a half hours later, they were in Lucile's bed, eating foie gras that etienne Bergere had grown from duck liver cells. Lucile was always hungry after she consummated a seduction.

"You are not going back to the guest house tonight," she told him as he licked the last morsels off her fingers. "I can order breakfast in tomorrow morning. Shall I speak the lights out?"

They settled into the bed. Lucile was always a bit uncomfortable sleeping with a new partner, but the bed was big, and she did like Godfrey. He'd let go a few of the secrets of the virus, including calling up a genomic profile from Marsnet. It was proprietary, but he had a password and went into NutriTopia Ares' file system. She'd copied it and tucked a duplicate into her own private files.

The wonderful thing was, she could just sit back and not do anything.

Mars itself would do the work.

Lucile was pleasantly dozing when she heard Bon Bon hacking up a hairball on the carpet. The coughing went on too long to be just a hairball. Bon Bon had been extra affectionate lately. Cats with kidney issues often sought the heat of human flesh. She switched on a light.

Bon Bon was convulsing on the floor by her bed. As she watched in horror, the little cat quivered one last time, then lay still.

Without answering Godfrey's sleepy "What's wrong?" she scooped the cat up, bundled on a trench coat,

and ran to the emergency medical clinic.

The medico on duty worked on the little cat for over twenty minutes, but it was quite dead.

"The virus?" she said.

The medico washed off her handfilm and shook her head. "Poor little thing. We think it may be like heartworm: Kill the parasite, kill the host."

Lucile was more than horrified. Her cat, her companion for eight Mars years, which had listened to her secrets and mirrored her slinking and her primping like a tiny mime, was cooling on a clinic table.

"Are you saying it could kill humans?" This was a nightmare!

At this point she realized that Godfrey had fumbled into his clothes and followed her to the clinic.

"No, no, no," said Godfrey. "The human test was completely successful! No ill effects whatever."

She turned on him with the fury of a global storm. "Then what killed my cat?"

He smiled unconvincingly. "It has to do with taurine enzymes. Uh, I don't think you'd understand—"

Oh, she was furious. "Try me!"

He buttoned one more button of his shirt. "The thing is, nobody completely understands it. We just know it works, because of the enzyme-blocking, you see."

The clinic medico said, "It's not really a parasite, like other protozoans. When a parasite evolves long enough with a species, it is no longer useful for it to kill the host. It eventually offers benefits to the host. When rats eat cat feces, the rats become infected. The rats' brains are changed. We think it might emulate a dopamine reuptake inhibitor. The rats begin to love cats. They are even attracted to the smell of cat urine."

"And this helps the cat." Lucile stroked the fur of her dead Bon Bon, who seemed asleep with half-open eyes. "Godfrey, how does the virus work? How do you know it won't kill everybody on this station? Even you!"

"The discovery was an accident. We were looking for a bacteriophage for a different disease."

She lowered her voice an octave and stalked closer to him. "How does the virus work?"

He backed away. "We—aren't sure."

She sank down on her heels on the floor of the clinic and buried her face in her hands, unconcerned that her coat gapped open and revealed her nudity. She looked up at Godfrey and said, "You have killed my cat."

"I didn't—"

"Something was wrong. You must have known."

"All right!" he barked. "All right! We didn't test it on cats! We tested it on hamsters because hamsters are cheaper. Hamsters are like cats, aren't they? Small, furry, warm-blooded? And we tested it on Fred Remaura, and he did just fine."

Lucile could barely contain her fury. “This is really true? You tested this virus on hamsters and one man, and then you unleashed it on two thousand innocent people and—oh my god—we have over five thousand cats here."

"I'm sorry,” he said meekly.

"You'll be sorrier,” she said with icy calm, “if you're not off this station tonight. Within the hour."

"I can't—there's no rocketplane until—"

"So call Utopia for emergency evacuation. No, wait, I'll call Jean-Marie. We have a rocketplane we use for light delivery. It isn't pressurized, so you'll have to stay suited up the whole flight, but I won't have to look at your lying face tomorrow. Or ever."

Godfrey got all stiff. “You forget that NutriTopia Ares owns every molecule of this station, right down to—"

"And this is relevant how?"

"I am a stockholder in NutriTopia Ares! I have rights here."

"How delightful for you! But it won't do you much good if you're here beyond tomorrow morning."

Godfrey deflated. “Why not?"

"Because you'll be dead."

He backed off, shaking his head and staring at her. She locked eyes with him until he turned and fled.

She stroked the still body of Bon Bon and wept.

* * * *

She told Jean-Marie, “The feral cats will save us. They inhabit the upper tunnels, where there is less protection from surface radiation. We have to do everything we can to ensure that some survive."

They fed and watered the feral cats. The cats died by the dozens, the hundreds. But Lucile, Benoit, and Jean-Marie fed them and took the bodies away.

* * * *

Jean-Marie's cat Aristide Brewpub did die. And so did the cats Benoit kept, Coeurl and her kittens, Albedo One and Chimere, rare albinos.

Lucile herself went through a horrible patch, ill with headaches and jaundice ("Been hitting the wine a bit much, Lucile?” Benoit had leered, and then she had whacked him on the shoulder with her personal office.) She checked herself once more for toxoplasmosis, and the test said she was still positive, but a more expensive test, ordered from Utopia, said no, she was clear of the oocysts. She threw into the recycler silky heaps of expensive lingerie and stiletto-heeled boots with built-in gyrostabilizers to prevent a twisted ankle. She mourned the woman she had been.

How could she have enjoyed being the slave of that microscopic tyrant, the puppet of that parasite? How tragic to be human, to ride the waves of passion steered by the wayward blood. Who was the real Lucile, the manic flirt in love with color, self-adornment, and complex flavors on the tongue, or the sad rational woman cured of her infection?

Benoit did indeed remember the multiplication tables again and proved to be such a finicky organizer of

her life and Jean-Marie's that she could barely tolerate the glare of clean desk surfaces.

She wanted a kitten. She wanted to be sexy. She didn't want sex, she just wanted to be crazy and attractive again.

She wanted to *be* a kitten.

* * * *

It took an entire Mars year for the die-offs to cease.

But.

As hard as it was, Lucile and the others had only one weapon: time.

Time, and the extreme environment of Mars.

The very harsh environment that forced the people of Gari Babakin to live under meters of regolith proved to be their friend.

It was just as she had learned from the notes in the NutriTopia Ares files.

Toxoplasma gondii was a protozoan similar to Plasmodium, the parasite that, on Earth, causes malaria. The difficulty of wiping out malaria on Earth is that the protozoan keeps mutating, so a drug that works one year will lose its efficacy a few years later. The protozoan mutates, develops immunity. On Earth, *Toxoplasma gondii* never did this, maybe because there was never a concerted effort to wipe it out.

But more likely it was because on Earth, *Toxoplasma gondii* didn't mutate very fast.

Mars organisms, all of them, are bathed in constant cosmic radiation. The radiation speeds mutations, and most of these are harmful. But if you're a parasite, and you reproduce very fast—

So they had only one solution: to take very good care of the cats in the upper tunnels, where the mutations would occur fastest.

The best meat. Carefully formulated meals with plenty of taurine. Clean water always available, from cat-sized drinking fountains.

"We must be very brave now," whispered Lucile. She squeezed the hands of Benoit and Jean-Marie.

* * * *

At the end of a Mars year—such a long time!—Lucile roused herself to take Benoit and Jean-Marie up to the tunnels where they had been cosseting the feral cats.

The cats looked different this time. Many of them had been dull-coated and listless the previous times they had visited. Today, there were fewer cats—so many had crawled away to die, and would have to be found and cremated—but those remaining were sleek and lively, fleeing the humans, or turning on them, puffing up with hisses and growls.

Lucile cornered one and picked it up to examine. It struggled fiercely, but she gripped its back paws and soothed it with her hand. Then she peered closely into its eyes. Its mucosa were pink and unblemished, its fear and fury palpable signs of health.

She clipped one of its claws too short and harvested a blood sample to take back to the lab.

It snarled and would have bitten her but for her quick reflexes. She let it go and it streaked away, leaving

claw marks on her arms. But she smiled.

Benoit caught her hand up and licked away her blood.

"All we had to do was take care that some of them survived," she said.

* * * *

The cats were hard to count, but the estimate was that thirty cats were still alive on Gari Babakin station

And the one Lucile had tested bore toxoplasmosis oocysts.

Which meant that they probably all did.

And those oocysts now contained *Toxoplasma gondii* that were immune to Godfrey's virus.

The surviving feral cats were reproducing. Godfrey Worcester hadn't dared come back to the station, but he had sent Dr. Hilda Wrothe and Dr. Kermilda Wriothesley, who wrung their hands and scolded, but since cats are easy to hide, they didn't have much wind in their sails, and besides, there was an outbreak of athlete's foot in Argyre Planitia City.

Nobody from NutriTopia Ares apologized, and Lucile felt a small cold emerald of hatred in her heart.

* * * *

Benoit gave her a tiny kitten. It clung to his shirt until he detached each of its twenty-four claws and handed it to Lucile.

"Where did you get it?"

He raised his eyebrows.

"It has a name?"

"I offer you that honor."

"Eclair," she decided. Eclair sank its twenty-four tiny needles into the fabric of her jumpsuit and purred. Its body was very warm. Its tongue was very pink.

"The feral cat colony is back in force." Benoit tried not to smirk.

"I thought everybody would take all the remaining cats for pets, after most of them died."

He shrugged. "Not all cats agree to be pets, just as not all Martians agree to play kiss-ass with the corporate jackboots. Some old toms fought like tigers. They don't trust humans, after what happened."

"And they all have toxoplasmosis? The virus has run its course?"

"Apparently. And people are eating raw meat again. They're raising hamsters to make steak tartare, imagine that."

She smiled slowly. "What a scandal."

* * * *

The medico at the clinic that had failed to revive Bon Bon had theories of her own. On Earth, toxoplasmosis benefited cats because cats were the top predator in their environment. Humans didn't count in that environment, because they didn't prey on either cats or rats. But on Mars—well, certain

humans could be top predators. At least, the mutated toxoplasmosis seemed to foster that situation.

But their prey was other humans, those of a different genetic background, in a suave and civilized way. Because NutriTopia Ares failed to understand that the virus hadn't completely wiped out toxoplasmosis, it spread wherever food was shipped from Gari Babakin.

Those with these secondary infections, with the other genomic background, behaved like prey animals. Prey animals that don't die, but rather buy. They were infatuated with all the products of Gari Babakin culture.

* * * *

"We are the Paris of Mars," Lucile said. She twirled, enjoying the swirl of her new red frock. Benoit and she had designed it, and now she was modeling it for a test audience: him and Jean-Marie. Soon she would offer it, as she had other creations, to the wealthy of Mars. Benoit had a flair for design, it turned out, though she didn't trust him to keep the Chez Raoul company books. She hired a woman for that.

She did, however, trust Benoit to father a child. The two designers did not breathe entirely easily until the little boy had reached his second birthsol and showed no damage from toxoplasmosis.

Etienne Bergere had opened a small restaurant that required reservations a Mars year in advance. A mysterious vintiniere now bottled a wine so exquisite that Terran billionaires paid huge sums to have it shipped to them on Earth.

Dr. Hilda Wriothesley and Dr. Kermilda Wrothe won Mars Global Storm Awards for their work in protozoan dopamine metabolism. Lucile watched the ceremony via netlink.

"Oh, look, Tigercat," she said to Benoit, "they're wearing knockoffs of our gowns."

Benoit, busy composing a poison pen letter to the Prime Minister of Key West, wasn't watching. "How do you know they're knockoffs?"

"Darling, we'd know if orders had been placed. And neither of them can afford originals. But more to the point, look at how they drape. Droplet manufacturing can't even approximate the real thing, eh?"

* * * *

Dr. Godfrey Worcester, sadly, found himself unable to do serious science after his collaboration with Drs. Wrothe and Wriothesley. He disappeared. Rumor had it he was deported to Earth after his arrest for stalking Lucile Raoul.

He said he loved her.

[Back to Table of Contents]

Novelette: **FOE** by Mark Rich

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Illustration by John Allemand

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Sometimes the hardest part of a problem is knowing when it's finished....

* * * *

"Can't you just ship him out, if he's a bum?"

To judge from her look, my question was way off base. Could I whoosh the words back in through my lips?

Then Dena MacLaren made a dismissive hand motion and smiled. She seemed an awkward sort—tall and slender with short, straight, brown hair, and given to motions of a timid nature. Awkward folk easily forgive others their awkwardness. Plus I figured she might be giving me a break because I, Jay Wirth, was a newcomer to Dometown 26, also named Neuhight, here in Bliss.

What a ridiculous name for a hilly plain on chill, arid Mars—Bliss! When I saw it on my travel arrangements I laughed at the error. Then I dug out a map. There it was—and now here I was: short and frizzle-haired, with more mixo-American melanin in my skin than maybe I needed on the planet of dusty-rose skies, even though a lot of other Martians had plenty, too.

"Because it's more than likely, Jay, that if I did that, they'd boot me off Mars, too," Dena said. "Like as not, none of us are quite up to our best abilities, all of the time, wouldn't you say? But you know all about that, or at least you will, in your new post."

Was there a touch of acid in her words? How susceptible was I, myself, to being instantly shooed off Mars? I had mulled over that very question on the slow ferry between Earth orbit and fourth planet. After accepting the job, I learned its previous holder had lasted none too long.

"I was just surprised by the idea, I guess," I said, hoping to patch over my gaffe. "Where I come from it must be a bigger problem than here. We have those sorts of thoughts, since it isn't something we can actually do—ship out anyone. But the presence of a bum's a little sign of inefficiency in the system, isn't it?"

"You mean a guy who sits around talking to anyone nearby? I don't think he's a sign of anything!"

"Our most useful people—"

I stopped myself.

Here I was saying "our"—about cities on a different planet altogether, far away from this enclosed, radiation-shielded Martian dometown.

"Back where I was working, I mean to say," I said, "we were finding the most useful citizens never quite retired. They kept themselves useful, at least a little. How smoothly can things run, after all, if all the know-how of your most experienced workers goes to waste?"

Dena's face had shown signs of softening toward me. Not anymore. Apparently I was putting foot deeper in mouth—maybe an operation easier to accomplish here, at less than one gee.

Her department was associated with my own, I assumed, so I had hoped to make a good first

impression. And since the job I had won, out of however many applied for this obscure Martian post, was that of Chief of the Department of Efficiency—or chief and staff, I should say, since the department had funding for a complement of exactly one—I had figured making a comment or two about efficiency would put me in good light. It would show I was on the ball from the moment I stepped off the Interdome from Claudetown in Neuhight.

Maybe my trouble was I had gone against my own instincts a moment before. I grew up with tales of my grandparents dealing with penury and all the disadvantages and prejudices the poor had to face back in the old America. I sympathized, really. I had put too much importance in Dena's choice of words: That might have been it.

On our tour we had reached an area where young maple trees dotted a wide, green park. Impressed as I was to find a small grove in the middle of Dometown 26, it surprised me even more to be informed it was one of several, and actually the youngest of the dometown's woods. The trees looked healthy, their thinner trunks accentuated by leaves that struck me as broader than usual.

Seeing the greenery made me more aware of the surrounding light. Martian sky-tint bathed everything with a dusty-rose glow. At one time, I read somewhere, the sky was not so reliably reddened, not in all directions, and not at all daylight hours. As had occurred on Earth, though, human activity had raised the level of atmospheric particulates, and the raised levels gave the Red Planet the sky tourists now expected.

The ambience here in the park raised goose bumps. Walking onto the path leading between the trees, I felt lightheaded. That dusty-rose light filtering between the broad, translucent leaves turned the park into an eerie, magical woodland bathed in a sunset I knew would last as long as daylight did. If the gateway to Faerie could be anywhere on rust-colored Mars, it would be in such a place as this.

On a bench sat a blue-eyed old man with short white hair and a suit that had seen better days—quite a few such better days, in fact. He must have tumbled out of bed and forgotten to freshen up before finding his morning cup of coffee, now steaming in his hand. Had I spotted him in Peoria or Elgin, back in sunny Illinois, I would have thought him harmless. When I heard his nattering at Dena about a church supper on Wednesday and about picking up groceries for old Brittney who was housebound at the moment, I consigned him to the talkative-old-busybody category.

After Dena introduced us, old Eddy said, “Oh, so you're the gentleman who's to be the new Face of Efficiency around here. Well, glad to meet you. You go ahead and make everything efficient around here, now!"

He laughed in a relaxed way as Dena and I went on down the path and away from that peaceful park—at which point she made the comment, idly intended I now realized, about Eddy being the official crazy old bum of Neuhight.

Caught off guard by the thought—bums on Mars?—I poised foot before opening lips: Can't you just ship him out?

As we walked from the park toward Engineering, I said, “So given my post I suppose it doesn't hurt to ask. How in the past have you dealt with it? I mean, resources are pretty limited up here. How long can you feed and house the ones who don't work?"

"Feed and house them? I suppose forever."

"Does that make sense, economically?"

"Maybe not. Economics isn't my area, though."

"What is your area, by the way? When we were introduced, there were so many to meet I don't have it clear who works where. Your department's akin to mine?"

"Nothing of the sort. I'm in humanities."

"Humanities!"

"That's right."

"This town has a department of humanities?"

"Of course."

"How strange," I almost said before catching myself. After all, I had managed, so far, to avoid exclaiming how strange it was Dometown 26 had a department of efficiency. While I was happy to have the job, why it should exist was far from clear to me, even after poring over the job description.

Dena noticed my puzzlement and said, "It might seem odd. But you know about Claude Onyell?"

"Name seems familiar."

"Onyell developed the human-resource systems of our dometowns. He's especially remembered here in the Bliss region. It's where he did his early work. And the Department of Humanities was his idea. Every dometown needs one, he thought."

"Ah. And how does the Department of Humanities feel about Mars having crazy old bums?"

"Jay," she said, shaking her head, "I should never have called him a bum. Eddy worked his years. He never made much and really didn't save much, but he earned his retirement. He's not really a bum."

Was that her personal or departmental opinion? I thought to steer the conversation away toward another topic, delicate though it might be, too.

"You wouldn't have an official opinion, would you, about the previous holder of my job? But I suppose that's outside your purview, too."

"Actually, I've observed your department fairly closely," she said.

"Really?"

"Yes. And frankly, I think it's a silly department, whether or not Onyell thought it necessary."

"You do?" Was I supposed to feel as shocked as I did? Having just taken the job on, I had little idea what might seem silly here.

"In fact," she said, "I helped get the previous man fired."

"Really?" I tried to keep my truly horrified reaction out of my voice. Was this seemingly affable Dena MacLaren to be my foe in Neuhight?

"Really, I did," she said dryly. "Now here we are at Engineering. Addie back at the reception told me someone would take over here. There he is!"

My new foe said good-bye in a friendly way and smiled as though amused by the silly new holder of a

silly old position in Dome 26. Even so I could not help but wonder how sharp her teeth were, behind those lips.

Then it struck me what old Eddy called me: the Face of Efficiency. It yielded initials like those of a fraternal organization: F.o.E. Who was the foe, around here? I was the F.o.E. So Dena was foe of the F.o.E.?

* * * *

I took a tentative liking to my new guide, Ron Pierce, from Field Generating—not a department exclusive to Onyell-designed systems. The idea of radiation shielding was as old as Lunar voyages and colonies; and the electrical generation of magnetic fields, the approach used here, was a standard but important element of dometown construction almost everywhere—even near the Earth poles, in this day and age.

Ron Pierce had looks to make me feel jealous. Of medium height, his strong jaw, straight-profile nose, and level brows might have made him movie material. His chestnut hair had just the trace of wave. It was all too easy to imagine women tromping all over me on their way to get nearer him.

On the other hand, he had a quirky, intelligent personality not normally associated with his type—in my mind, anyway. It even turned out we had interests in common, including, oddly enough, Earth-side botany. You see, I had been a bio major before falling tumultuously in love with a sultry brunette in gov. I started taking classes in her department, changed majors out of a sense of making a practical decision about my life, and won acceptance into the same grad school she did—after which she dumped me.

Ron asked what had made me apply for my job.

"I wonder that myself," I said. Then I told myself to speak with more care, lest it should seem I took my post lightly. Did I need to appear sillier than I maybe already was?

Ron laughed with understanding, though, and waved his hands in the air, as if to indicate his surroundings. "Look at me, Jay," he said. "I wanted to get into field biology but then got good scores in math and ended making a career choice. Better paying jobs, in this sort of stuff. Crazy. But I don't mind how it turned out."

So I told him my course of action, in life and education—or inaction, since I somehow early embraced that mistaken idea that it mattered little what I did for a living. Did I need to enjoy work? It was just for money!

Maybe my girlfriend had been so much the love of my life—or the opposite, whatever that is—that I lost sight of myself early on ... the first time I set eyes on her, maybe.

By the time I started regaining any sense of what I was actually interested in, as a person, it seemed too late. I took jobs in city-street management and urban development. Though I felt miserably bored, a lot of the time, I could hardly afford to drop everything to go study lichens and liverworts—it always having been the tiny and oddball that tripped my botanical trigger.

"And that's what made you look to Mars?" Ron said.

"Ridiculous, isn't it?"

"Lots of us, here—we're Martians for ridiculous reasons. You'd be surprised."

"You mean like we're escaping Earth jobs? Seems like people do the same kinds of work up here they did down there. Except maybe me. I don't have much of a clue what I'm supposed to do."

"Maybe no one does."

I asked what he meant.

"I've watched," he said, "not because I'm nosey but because a dometown's a small place and you pretty much hear all the news. But you know how many people have held your job in thirty Earth years? I'll tell you. Sixteen. Sixteen people have gotten your job and then gotten out, or been pushed out. We on the outside don't know what's happening over in City Hall proper, but I figure, with sixteen people in the last thirty years, something's up, right? Maybe the job's so awful people hate it and just need to get out. Maybe no one wants to be the one snapping the whip. Or maybe it's just a good job but a tough job that's waiting for the special person."

"You make me feel real secure."

"I think folks usually land on their feet, once they're out."

"But what if they send me back?"

"Send you back? From Mars? After getting you here? Who can afford to send anyone back? Don't talk crazy at me!"

He laughed, saying that. Even so I detected a grain of truth in what he said. If I messed this up, I might be out a job—but not a planet.

A Martian—already!

Ron took me to the Engineering roof, where we stood on a spongy walkway between solar tiles, gazing up at the rosy sky and the complicated undersurface of the dome itself.

"You see, it's partly a solid dome and partly see-through; and the magnetic shielding is just as important a component as the glass and metal. There's even a bit of shimmery light effect off the field. The titanium-alloy struts between the panes are painted, so they pretty much disappear against the Martian day sky. But you can tell they're there. At night, if you're walking along and looking up, you'll see stars wink out, just for a split second. People like to do that, in fact. They take walks in the evening and if they can see Earth, they make it blink behind one of the roof struts. It's like a tiny blue eye winking. A child's game, really—but people have been doing it so long it's habit, now."

"People think about Earth a lot, up here, don't they?"

"You're giving yourself away!"

"What?"

"You say, 'Up here.' We say we're 'down here.' Earth's 'up there.' Opposite to the way newbies put it."

"I still think of Mars being in the sky. And Earth—well, it's Earth."

"Like I said!"

Before being handed off to someone else on my tour, I asked Ron if he had any notion what my job really was.

"The problem in answering that, I guess, is in figuring out what efficiency means," he said.

"For engineers I figure it's clear-cut."

"I'm not so sure about that, myself. Because look: mistakes aren't efficient. That said, though, sometimes I think an efficient system for people is one that lets them make mistakes," he said. "If you can't make mistakes, you don't learn. And what kind of efficiency is it, that won't let you learn?"

* * * *

You can get to know a person any way at all—except efficiently, someone said to me. Is there a way to efficiently learn a job? Am I to know? By day five I was losing track of who said what, who made which allusion, who suggested what idea to whomever else. I was feeling lost—quite lost. A Martian dometown may be small, by Terrene urban standards, but I needed do no more than turn a block, with my funny, big-stepping Earth walk I hoped to shed before too long, and I would find myself in the totally wrong place. Fortunately I knew people too poorly—let us say, too inefficiently—to stumble into the wrong situation, in anything like personal terms, for everything I did was all impersonal and official, just the stumbling of an Earthman lost in a tiny place on Mars, just the wrong turnings of the ignorant newcomer. These streets had never had any reason to be particularly straight, contributing to my confusion. The dometown had sprawled outward from its center through accretion, not planned growth. I kept going wrong ways and taught myself to stop being surprised when I did.

This fifth morning, though, I walked into Prithivi Park and came upon a scene that left me amazed. I asked myself, Should I weep at the sight or laugh? What first struck my eye, though, was a vision of such normalcy I puzzled over what seemed odd about it.

Two curly headed girls, one in a light green dress and the other in a bright tulip-yellow outfit, sat at a small table and chair set. They must have brought it here, for a tea party. From a small white pot they poured water into tiny cups to daintily sip.

They seemed perfectly content in their playtime, beneath that dark blue sky...

Blue?

I stared upward, baffled. Then I heard voices. When I moved nearer I made out this:

"All right. Now that you can hear me, can you just tell me what in the heck you're doing!"

I spotted the voice's owner, deeper in the park: Rhoda Davis, one of the grounds crew. I had met her before on my rounds.

"What does it look like I'm doing?" said a voice of someone hidden by trees.

"It looks like you're painting the sky!"

"Well," said the other. "That's it, all right."

Once I took a few Earth steps nearer I saw Eddy, the old man, atop a wheeled riser platform. The support struts were mostly folded up; he must have brought himself down to talk to Rhoda. This part of the dome not being particularly high—the trees must have been dwarf varieties—Eddy only had to be up thirty or thirty-five feet to reach the inner dome surface.

Atop the platform was one of those lightweight painting outfits with a roller easily five feet wide. I tried one out, once, and found it amazingly balanced. Even a child could easily paint a wide swath—as could a retired oldster whose morning fitness routine involved finding an exercise bench of the park variety, where he could heavy-lift the eight-ounce cup.

"You see," said Eddy down to Rhoda, "I had this idea to paint the sky blue. And at the hardware outlet they had a lot of blue paint on sale. Just house paint. But it works! It's taken me all morning."

"You're covering up the glass!"

"Oh, the paint's translucent enough, and it'll clean off. I made sure about that, at the hardware outlet."

Having noticed me, Rhoda nervously looked my way now and then. I took her glances for a reminder: I was not here as Jay Wirth, newcomer from Earth, but as Jay Wirth, F.o.E. Was I supposed to react to the crazy old bum's actions and mutter about lost man hours, or the waste of paint—surely a scarce enough commodity on Mars, even if on sale at the hardware outlet?

"Now look at the girls," Eddy went on, pointing down. "They like it. Don't you, girls? Don't you like a blue sky?"

Both yelled a hurrah. I wondered if I should wander nearer, or if that would mean getting myself involved.

Rhoda Davis made up my mind for me, by walking in my direction herself.

"Listen," she said. "Don't mind Eddy. He means no harm. This will decrease our solar gain a little, even though it's just a small sub-dome, over this park. But it's a little aggravating, you know? To have to clean up after him? Oh, well! Life goes on!"

She eyed me curiously, as though waiting to see how I would react. Then she half-smiled, although her eyebrows still seemed frowning. She walked away, shaking her head, toward one of the grounds buildings.

"Don't worry," she called back at me over her shoulder, "I'll have a gang here pronto to get that off!"

The two girls, meanwhile, were having a grand time at their tea party. Being still pretty much a stranger, I figured it best to not bother them, although I wanted to do nothing else than to go over and bathe in their sunny cheer.

Blue sky, on Mars! Last I looked, Eddy was boosting his lift skyward again, gazing upward with a grin on his unshaven face. I guessed he would keep on, until someone stopped him. Was I supposed to? In my pocket I did have my all-powerful "Efficiency Orders" pad, which I had yet to use.

I just watched the two girls for a while more, then went along down the street.

When I checked in later, to see if Grounds had shown up with foam cleaner to remove the paint—I had checked into what they would use—I found no workers on hand, as of yet. I knew they had a full slate of chores for the day, to judge from daily efficiency reports the supervisors had logged over the last few days.

The girls had finished their play and had left, too.

This is not to say, though, that the modest parallelogram of Prithivi Park sat empty. Far from it.

I had walked through quite a few of these small parks, beneath their various sub-domes, since arriving, and without fail I would see a few people sitting on benches or wandering the paths between trees and shrubs. I believed they were finding relief from a townscape that otherwise tended toward the too rectilinear and too well contained. The juxtapositions of random leaves and branches against nearby building fronts, and the smell of grass and earth ... the eye and nose needed those sights, those smells, and maybe the brain needed them, too, after working inside enclosed, human-determined spaces for most of the day.

The parks did people good, and by very simple means—or maybe not so simple means, really, given the

massive amount of engineering that lay behind the sheer possibility of there being such sub-domes within an elaborate Martian dometown habitat.

Today, though, Prithivi looked about as packed as I had seen any space here in Neuhight. People packed the half dozen benches. Others were walking the winding paths—and then turning around to retrace their steps. That accounted for the higher than usual density, I supposed. Lots of people casually walked through these parks. The dometown was set up exactly so that people were almost forced to go through one or two in the course of their daily activities, as the simplest of dometown mental-health measures, but now people were backtracking and purposely going through second and third times. And many of them—this struck me—were vaguely smiling, sometimes nodding.

I felt a nudge against my arm.

"Eddy!" I said. The old man, in paint-stained coveralls, leaned against the wall where I had stopped to take in the scene.

"Look at that, will you, Mr. Wirth," the old man said. "I just had this notion and I don't know why I went through with it but I did, and by gum these other folks like it. Just look at them. It's the sky, you know."

"The sky?"

"Maybe it's hardwired in us, you know? I suppose that's why blue is such a good seller at the hardware outlet. They told me it was, when I bought this. Even though they ordered too much, it's still a good seller. And you know they were surprised I was buying so much? But I said I had a big room to paint. Mighty big." He laughed.

"Eddy, how could you afford to paint the sky of this whole dome?"

"Oh, I spread it real thin. Some of the light comes through, see? And I know the paint has to come off real soon. That Rhoda Davis told me so. I don't mind. I just had the notion and I did it and look how glad people are, walking around there. Isn't it pretty?"

"I still don't know how you could afford it!"

"Well, Mr. Wirth, you have to save for a little craziness now and then. It's good for a person to have a little craziness, don't you think?"

"You know, Eddy, I think you'd be the only person in this city to talk to me this way."

It had just sunken in, how people in Prithivi were catching sight of me, increasing their pace a little, and leaving.

"You mean to talk about needing a little craziness?" said Eddy. "Well, I suppose when you, Mr. Wirth, look at people it worries them, that you're looking. Me, I'm not worried. I'm retired. Those others, *pah*, let them worry. They still have to work! Me, no! Let them worry!"

"They're worried about me, you mean?"

"Sure. You're the Face of Efficiency here in Dometown 26, Mr. Wirth, and sure they have to worry about you looking at them, because they have their jobs and you have yours."

"You can call me Jay."

"Sure. I'll try, but it's hard remembering that when you're dealing with the Face of Efficiency. You know

what I mean, Mr. Wirth?"

I walked away, thinking of the way Rhoda Davis had left me, earlier in the day, with an insincere smile and frowning eyebrows. Worry? That could have been in it. In fact, from what I could see, maybe I had gotten this job because no one here wanted it. Had Ron said something to that effect? Who wants to act the heavy? Who wants to crack the whip?

For all us bums secretly know we are not really very good at what we do, that we goof off too much, that we fail to get much done. The last thing we want, though, is to be found out. Everyone fears an Efficiency Ogre!

And that ogre was me.

I saw the pattern, now. People came from outside, took this job, became the ogre—and then could take no more. So they got out.

Or else they were too good at being the ogre and got themselves hated—and so were pushed out.

The Ogre of Neuhight! Last thing I wanted!

Because once perceived as an ogre, and forced out ... who would hire the ogre for more pleasant work?

So if I were to mess up in my job, I had best do it in the most easygoing, affable way possible.

The most inefficient way, too, for that matter!

For messing up looked the best way of not being forced to become the Ogre of Neuhight.

* * * *

First place to go, I figured, was Engineering, where I had noticed this thickset, mop-haired fellow Nick Chomis. He had looked a little harried and surly, the day I toured the building. I knew Ron Pierce and his department had a pressing deadline for turning in some analyses to Claudetown, where the regional government had its seat. They also had work to do relating to the Bliss Region Dometown Summit, the next week. A lot of city offices were feeling a time pinch due to that.

I walked over to the desk of this Nick Chomis, who showed weariness in his baggy lower eyelids and slumped posture. He worked too hard. He would obviously be a prize performer for any Chief of Efficiency in any dometown on any planet of the Solar System. In fact, from the daily efficiency reports, I knew he was exactly that.

So I sat in the chair opposite him, tilted it back, and stuck my feet up on his desk.

He suddenly put on those worried, unhappy eyebrows I had seen on Rhoda Davis—without the smile.

"What's this?" he said.

"You're overworked."

"I'm always overworked, but that's what these freaking deadlines do to a soul. Sorry. Now if you'll allow me—"

"No, I won't. You know, I've looked over my job description, and I have plenty of discretionary power in cases of efficiency. I'm supposed to step in. You're overworking and you look like you're going to make yourself sick working too many hours without a break. How efficient's that?"

"You're going to make me take a break? What are you going to do if I don't? I have a heck of a lot to do and don't have time for this!"

"I'll just sit here and bug you until you take a break. No sweat off my back. So are you going, or am I staying?"

We argued about it for five minutes, with others elsewhere in the room noticing something funny was going on and furtively peering our way now and then. Finally Nick agreed to take fifteen minutes. I told him to go to that nearby Prithivi Park. He fumed and kept from muttering curses loud enough to be heard distinctly and walked out with something less than joy in his step.

Walking outside after him, I followed his dwindling form with my eyes to make sure he was not looping back around. I decided not to follow: That would be a little overzealous. Maybe I would cut off from work early today, to make a point. Yes! Time to cut out for a beer!

I ended up working a while past my standard shutting-down time, though, mainly because I was banging my head trying to think of ways of being inefficient and not really coming up with anything good.

Over the next day or two I found few other chances to impose inefficiencies, unfortunately. One opportunity did pop up while touring the water department, where pressure was being felt due to that Dometown Summit. A young, willowy underling named Diane Ho sat dithering at her desk, stylus in hand but eyes on the ceiling—making it only natural I stop rather than walk by.

"What's up?" I said to the daydreamer.

"Oh, Mr. Wirth! I'm sorry, I was just worrying about my concert in the park on Friday. There's a part in the Langetti that still bothers me, and I'm afraid I got distracted, thinking about it." She had a fast, animated manner. A bundle of nerves, in other words.

"Musician?"

"Violinist."

"But you have plenty to do right here at your desk, don't you?"

"Oh, yes, Mr. Wirth. In fact, Gilda—my boss—is on my back to get these analyses done by tomorrow morning—"

"Indeed," I said, getting out my Efficiency Orders. The pad made my words official, sending copies automatically to my office and to town records. It let me leave the proverbial paper trail—in this case, I hoped, of my inefficiency. "Give this to Gilda. Tell her I told you to leave early, to go home and practice. In fact, why not leave right now?"

"Now?"

"Yes, now! Obviously you're thinking about practicing, not work, so just go and do it! Doesn't make sense trying to think about two things at once."

I scribbled out the form imperiously, handed the print to her, and left before the puzzlement in her face could make me feel too foolish—and before Gilda could get her hands on me.

* * * *

I ran into Nick Chomis again only because I had just written a note to leave work early myself—a silly measure, really—but I had been working too many hours, to tell the truth, and had found it strangely hard

to leave my office before the daily departmental efficiency reports started appearing at the end of the afternoon. But I forced myself, this day, to make a minor but still flagrant show of inefficiency.

I sauntered over to a nice open-air cafe that had a dozen tables along the sidewalk beneath the rosy sky and another seating area beneath a gaily-striped awning. On a tall stool there, at the counter, I saw grumpy Nick sitting with Ron Pierce. To my surprise, Nick caught my eye, smiled, and waved me over.

"Why did you make me go to that park the other day?" he said, sitting with his hands around a soda.

"For the reasons I stated."

"Yeah, sure. But listen. That was really interesting. I took Ron here over there, too. People all over the place—and they were, you know, happy? They kind of wandered around with this puzzled look, as though this was a spot they'd been to before, but couldn't quite remember. And what it is, of course—it's Earth. It's like going back in time. You know what I mean: For a lot of us, Earth means going way, way back. And it's that association. It made people smile, that messed-up sky did."

"Ah," I said. "That mischief maker, Eddy!"

"Right," said Ron Pierce. "And I suppose you got all over Grounds for not getting the paint off until halfway through the next day."

"They didn't? Well, I didn't know. How inefficient of me." I wondered if I could write myself a reprimand.

"Well, it's true, they didn't. And you know?" said Ron. "Grounds was a little reluctant to get started. People actually wanted it left up. But the trees, you see. The paint was compromising their light source."

"I still liked that look," said Nick.

"Right! So did I," said Ron. "It was like walking into a park back on Earth, and the sky was a shadowed blue, like in late afternoon, early evening. Really sort of beautiful."

"Anyway," said Nick to me, "after I dragged Ron to see, we had this idea. We could alter the field output on the generators and use just a touch of other lighting effects—and it's kind of funny, but we could actually turn the main dome sort of blue, without using paint. It wouldn't be the same as an Earth sky, but it wouldn't be any kind of Martian sky. It'd be blue. Wouldn't that be a trip? I know if we did it you'd be all over us, because it would mean our solar gain would slip, and we'd even be losing out on a bit of power generation, and really it's not the best idea because of what our various plantings need, all over Neuhight—and on top of that it would mean a bit more energy being pumped into our field generators than usual, to achieve the color. All around, not a good idea. But we thought it was a fun notion."

"You could do all that?"

"Sure. Just a little set-up time. I mean, I can't do it. I'm too busy. I'm just here for a break—see? I'm following what you said and I'm taking fifteen minutes before working late tonight! But Pierce here, he could set it up, couldn't you, Pierce?"

I tried to keep down my grin. "And it would cut back on energy gain and take extra power?"

"Well, sure."

"Do it," I said.

"What?" said Nick.

"Here. I'll give you a note from my office. I'll just write on it, that I promise not to get in your way. It's official now."

"But it's so—inefficient, is what it is!"

"How do you know that without trying?"

"You'll let us?" said Ron. "Both Nick and I have the demerits piled on pretty heavy from that last guy! And you know those demerits slow down raises. One of the damnedest things about our constitution is that power to dish out demerits from the Office of Efficiency! Ouch, do those hurt!"

"I won't give you any." I turned to go, to hide my pleasure at this turn of events—then looked back. "Say, you think you could have it up and going, noon Friday?"

Ron thought for a moment. "If I go in just a little early that day—well, sure. I could have it up then. Just a test run. Might not be really sky-blue blue. But it'll be blue!"

"A test run," I said. "Maybe for the afternoon?"

"You know, you advocate inefficiencies like this and you'll be talking yourself out of a job!"

I laughed as though he had made a joke and vamoosed.

* * * *

I seemed to be laying down a pretty good trail of inefficiency there toward the end of the week, although I picked up a few danger signals that a few of my efforts might be backfiring. When I was walking to the lunchtime concert on Friday, the violinist's boss Gilda walked up and thanked me for making Diane take off from work. Gilda had felt obliged to keep pressing for the charts to be finished, even though she knew the girl was getting tense about not being as prepared as she might be for this concert. Then it turned out Diane's afternoon of practice went so well she went to work early the next day, before anyone else showed up—and finished her work in double time, having dispensed with her worries.

Then Fred Amik, one of the supervisors in Grounds, came over and thanked me for not pressing the issue on that paint cleanup deal. Rhoda had hinted to him I would be knocking at his door about it, since I had been there in the park, scoping out the situation—and Fred knew exactly how that last Face of Efficiency would have handled it! Fred felt a few ouches from demerits, too, it turned out. So he said he liked my relaxed manner, and that his crew got the work done faster that next day than if they had been forced into overtime—because you know how people can get, Fred said to me, if work hours eat into their pub time.

Sure, I said back to him, hoping my affable inefficiency would get noted somewhere, anyway—for not forcing the job to get done quickly ... although that had made a crew more cheerful and thus, darn it, more efficient about doing it.

Whatever their reports, if Gilda and Fred made any, at least I had the automatic backups to all the notes I wrote—all my efforts at injecting a little inefficiency into the system. Among them was the note to Nick and Ron, setting off what I hoped would be my best effort—using more generating-power, cutting down on new power generation, reducing plant transpiration because of reduced light—and so on and so forth. To add to that, I would be setting a half dozen city departments behind schedule, for I had figured out which ones were least ready for the Summit: Would they ever be fighting mad! But I had remarked at frantic office work seeming a little high-pitched and insisted everyone show up for the lunchtime

concert—for wasn't that what the concerts were for? To brighten their tedious days? To refresh their overheated minds?

It sounded almost sensible, what I was making them do, but it also seemed a good bit less than fully efficient, given their tight schedule.

I looked around the park, from my spot at the edge, and beamed. A crowd had turned out—bigger than Dena MacLaren had told me was typical for these affairs. Although everyone thought the concerts were a good idea, no one seemed to have time for them. I noticed a few grumpy faces, making my heart feel lighter. I figured there would be more such, as the noon hour wore on and people started checking their watches.

Then the sky changed, with white streaks crossing the reddish-orange noon sky. I wanted to clap my hands for Nick and Ron. Although I heard a few gasps and plenty of murmuring, I heard no alarm. Nick and Ron seem to have just let people know to check the sky, at noon Friday, without letting on exactly what would happen.

The sky color shifted again, with the remaining oranges, reds, and dark pinks fading away. More whitish streaks appeared, along with waves and then patches of blue. It was by no means Earth-sky blue—but not totally unlike it. This sky had shades of purple and even green, here and there among the different blues. I knew it would be a variable effect—partly because the electric lines creating the magnetic shield were such a complicated array, partly because the area being covered was so huge, and partly because the topology of the dome's upper surface was not even remotely like an evenly rounded hemisphere, but more like an irregular hump surrounded by smaller ones, or like a large, weathered volcanic cone surrounded by smaller, irregular, rolling hills.

After the hubbub died down and everyone uncrinked their necks from gazing upward, the music started. The quartet started with a short capriccio by Martian composer Langetti, to be followed by some considerably older fare, with Schubert and a bit of Bartok. Listening to the Langetti, I could easily imagine why young Diane had worried so; her part, as first-chair violin, called for a lot of speedy dexterity. The up-tempo virtuosity worked everyone up. People clapped with enthusiasm at the end.

A good time to leave, I figured. Many in the audience would be itching to get back to work on the Summit, pretty soon. It might be good for me to be elsewhere—however much the Schubert's opening measures made me want nothing else but to linger and listen.

I was in a good mood, anyway, and decided to walk around the city aimlessly, enjoying how it looked beneath the patchy blue sky, and relishing the notion that every second the generating fields were operating in this mode, the city's overall efficiency was going down, down, down ... and in several important areas, too. What a fine day! I had arrived from Earth hardly more than a week before, and here I almost felt myself back there, beneath wide Midwestern skies.

I took my sweet time, finding a few avenues I had not yet explored. I spotted a few others to investigate another day—maybe when I was unemployed and had nothing better to do than just this. I looked around speculatively. Were any lichens growing in the cracks in these sidewalks or walls?

Past my usual quitting hour I returned to my office door, and turned around the “OUT” sign on its hook. The timing was good, though: Now I could run over some of the early efficiency charts being automatically generated by the city hub-comp.

I grinned at what I saw: The magnetic fields were markedly higher in energy consumption, for the afternoon—with no increase in efficacy at ionized-particle deflection. Another chart showed inside-dome energy production, which provided a fair fraction of daily needs. Down, too!

So I pulled up other charts coming in; supervisor reports, and the like. These troubled me a little. No notes about falling behind ... in fact, I found some opposite indications. Puzzling. “Morale: up!” two said. Then I checked reports from the departments behind in preparations for the Summit. Five out of the six had nearly caught up on their work!

In puzzling over this I barely heard the knock.

"Working late?” said a woman, sticking her head in the door. She looked like someone I should know, although I failed to place her.

"Just a sign of my inefficiency!” I said, trying to score one last point against myself for the day.

"Nonsense, Jay! I'm glad someone in your office finally has a sense of proportion. Jay, I'm Janice Kawabata, mayor of Dometown 26, Neuhight, and I've been meaning to come over and meet you. I was a little hesitant at first, given that our two offices have been at loggerheads so often in the past—because as you know the town constitution gives you the power to act almost at random and almost without check! And it hasn't worked!"

"Sorry to hear that,” I said, although pleased to hear my activities fell within so fine a tradition. I would be kicked out of this office in no time.

"But you, Jay! I'm impressed. I needed to come over right away after seeing what happened with those commissions getting ready for the Summit. Do you know I think we have an ethic of overwork here in the dome? And you spotted that right off. It actually hinders people from getting work done. And that blue sky stunt! I heard rumors about it and thought there'd be trouble brewing between you and those crazy mag-field guys—but then I saw you were involved, yourself! And then the reaction! Why, people were smiling at me who have been grumbling for ten months straight ... and suddenly there's all this fresh energy in the offices! And do you know we're almost completely back on schedule in our preparations? People are full of vim and vigor! It's weird, seeing everything happening so quickly and things humming along so smoothly. You're fresh from Earth, so you probably don't know how seeing that blue sky felt! But—wow!

"So now I'm thinking,” Mayor Kawabata said. “What if we did this blue sky afternoon regularly? Maybe once a week? Just because ... well, maybe there's something to the idea. We humans evolved beneath a blue sky, right? Maybe our brains need a regular dose!"

"But the inefficiency,” I said, with a voice sounding weak and mousy even to my own ears. “There's less light intake and—"

The mayor waved her hand dismissively. “I think we can make up for minor downsides of that sort, Jay. Now, I'm sorry I've got to run—but I had to stop by! Thank you so much!"

I stood there in my office dumbfounded. I looked back at my desk. Suddenly it looked much less attractive, the idea of inspecting any more efficiency reports that might be rolling in. I shut everything off, closed the door, and went out.

On the street the first person I saw was the tall, awkward form of Dena MacLaren. I smiled immediately, for here was the stated foe of the F.o.E. She would see to it that my inefficiencies would not slip by unnoticed. She would see me reprimanded and fired!

"Oh, Jay!” she said. “You disappeared from that concert this afternoon. I was looking around to thank you for what you've done! I've been at war with the Office of Efficiency since my first day here because the chiefs before you have mostly wanted to shut down our concerts—and I can't tell you how wonderful

it is to have your office on our side for a change!"

She ran off, almost bouncing. Dazed, I wandered over to the park and took a seat. So thoroughly absorbed in my debacle—here I was, being mistaken for efficient, and in a pleasant way!—that I failed to notice the bench was already occupied.

"And here he is, the Face of Efficiency," said Eddy, looking over at me and nodding his old, unshaven face. "Yes, sir."

At least Eddy knew the truth. I had to take consolation where I could. He saw through this facade of efficiency, down to my real nature. Surely it takes one bum to recognize another.

"Yes, sir," said Eddy again. "You know I've been here in Dometown 26 for nearly fifty years, and those are Earth years, Mr. Wirth, and I've said since day one that what Dometown 26 needs is a blue sky, just to make people a little more cheerful. That's all. And it doesn't cost much, does it? My paint sure didn't. But fifty years, I said this. And here you are, there with your nice shirt and pressed pants and you're the Face of Efficiency, and what do you do? No one else could do it, not in fifty years, but you did it in a week! And look how people were just happy this afternoon, and they really didn't know why! But it was the sky. That's all. Just that blue sky."

I opened my mouth to say something. Nothing came out.

"Yes, sir," said Eddy, "and you don't have to thank me, but I think you're doing fine and you'll be the first to hold that job of yours for more than a few weeks. First in quite a while—yes, sir! I'm an idler, but I can tell that sort of thing, about people who aren't!"

I sat there feeling depressed.

"You know, Eddy," I said to him, "if it's the way you say, then you seem to have gotten a lot done, for an idler. But this was all due to you. You and your paint!"

"'I have been an idle fellow all my life.' You know who said that? It was Dr. Johnson."

"Dr. Johnson?"

"That's Samuel Johnson. 'I have been an idle fellow all my life,' he said, and if he was talking tongue-in-cheek it was because his cheeks were so very large. He was a big man, you know. Big in more ways than one. He could contain within himself the busiest fellow in the Western world, because you know he wrote a dictionary of the English language. Think that's easy? You try! But at the same time he could be an idle fellow. And you know?" said Eddy. "I like that."

The next day I sat in my office going over old documents. Old Claude had it right, for his day and age, in insisting upon the Office of Efficiency. This was Mars, after all. Conditions were such, back then, that keeping human life going was a precarious and miserable proposition, what with mining operations barely in their infancy, raw materials exorbitant in real costs, and most manufactured goods and foods needing to be shipped in, across daunting distances. So there needed to be an Office of Efficiency, double-checking every dometown operation, making sure every manager and supervisor and worker was doing her and his absolute best to use every ounce of raw material and every spark of energy in the best way possible.

Those were the days, yes, but here we were in a new day, when a dometown on Mars was growing maple trees, and a worker could retire to idle away a morning on a park bench.

Maybe those early Offices of Efficiency did their work too well. Now this ethic of overwork prevailed,

as the Mayor had said—and the Office of Efficiency had kept on overseeing this overwork, encouraging it and making it worse, year after year, decade after decade—installing overwork as the official state of normalcy.

A mistake ... from which the previous chiefs of the Office of Efficiency seem not to have learned.

And as for me?

The sign on my door I mostly left alone. I had to maintain appearances, after all, if it were to transpire that I would keep this job. I called over a new friend from Grounds, though, to have her change the place where the hook was.

I hoped someday I could just hang my “OUT” sign there for good. In the meantime, though, with the hook now off to the side, in front of that “of,” folks might get an idea of where I really stood, when I was...

Office
of
IN Efficiency.

[Back to Table of Contents]

Reader's Department: **GUEST REFERENCE LIBRARY** by Richard Foss

Singularity's Ring, Paul Melko, Tor HB, $24.95, 315 pp. (ISBN: 978-0-7653-1777-3)

Blue War, Jeffrey Thomas, Solaris PB, $7.99, 407 pp. (ISBN: 978-1-84416-532-2)

Death's Head: Maximum Offense, David Gunn, Del Rey HB, $25.00, 368pp. (ISBN: 978-0-345-50001-4)

Pirate Sun, Karl Schroeder, Tor HB, $25.95, 320 pp. (ISBN 978-0-7653-1545-8)

Reading The Wind, Brenda Cooper, Tor HB $25.95, 448 pp. (ISBN 978-0-7653-5509-6)

The Science Fiction Hall Of Fame, Volume Two B, Ben Bova, ed. Tor HB $29.95, 544 pp. (ISBN 978-0-7653-0532-9)

The Coming Convergence, Stanley Schmidt, Prometheus Books HB, $27.95, 336 pp. (ISBN 978-1-59102-613-6)

* * * *

In decades of reading commentary on SF and attending conventions, I've encountered endless discussions of how modern science fiction is different from the works of the Golden Age. Indeed it is. We now have protagonists of both of the usual sexes and a couple of new ones, and they're as complex, angst-ridden, and—in some cases—kinky as anything in mainstream literature or psychiatric textbooks. Our futures not only have nuts and bolts, but warts, blemishes, and cracks, and nowadays our generals need to file environmental impact statements before unleashing death rays on invading alien insects.

But the biggest difference is the structure of the stories themselves. The majority of written SF used to be short stories in magazines like this one, with the few longer works either serialized in the same pages or appearing elsewhere as an Ace Double or a stand-alone book. As publishers released more book length works, longer story arcs began to appear, starting with Asimov's *Foundation* trilogy in 1951*. By the 1970s, multivolume works of SF were no longer unusual, and by the 1990s they were the norm. Near as I can tell, over 70% of SF books nowadays are part of a series, though whether this is because readers have very long attention spans or publishers like to buy books with room for sequels, I cannot say.

[*And for those who are going to argue that the *Lensman* or *Skylark* series were first, I acknowledge that they are earlier and longer. However, the *Foundation* trilogy was a much more significant influence on the field. And yes, there were other early series novels, but most of these recycled the same characters with little or no development from book to book.]

Which brings us to this month's trove of books: four segments of various series, one excellent first novel, a collection that reminds us what SF used to be, and a compendium of essays about science by a promising young author.

* * * *

The debut novel is **Singularity's Ring**, and it's a delightful piece of hard SF told in a unique voice—or should that be voices? The five protagonists in this book are Apollo Papadopulos—and that's not a typo, they are five individuals who have been genetically engineered so they can link to form a composite consciousness. Each individual has their own personality and brings their own skills to the group mind, but each has their own inner life. Characters who can meld consciousness have been the subject of science fiction stories before, but it has rarely been done this well—the individuals that form Apollo Papadopulos each narrate sections and chapters here, giving a vivid idea of a multifaceted existence.

The story begins on a sparsely populated Earth, a generation after most of humanity has moved to an orbital ring and undergone some sort of transformation that has led them to stop communicating with those they left behind. Apollo is an aspiring starship crew, being tested along with other multi-minded teams in rugged terrain, when a suspicious accident occurs. Odd events follow, including an encounter with telepathic bears and a meeting with a surly recluse who might have access to the secrets of the ring. I won't even try to describe the plot further—it is complicated, subtle, and brilliantly thought out, and would have been a fine SF thriller even without the unique viewpoint character, er, characters. The dynamics of the relationships between these linked people are particularly well handled—we see the loving support and teamwork we might expect, but also some tensions and weaknesses that are outside our normal human experience. Author Paul Melko has produced the best first novel I can remember reading in years, a satisfying work in a world I wouldn't mind revisiting.

* * * *

I wouldn't mind revisiting the two worlds that are the setting for Jeffrey Thomas's **Blue War**, either, but I wouldn't want to live in either. One is a planet with a primitive alien culture that is dealing with the legacy of a recent civil war, and all we see of the other is the human city called Punktown, a gritty urban sprawl that seems to be inhabited entirely by misfits and losers. Jeremy Stake is a Punktown private eye in the classic mode and a veteran of the war, and he is on a case when he returns to the scene of the battles. It seems that an automated construction project designed as a small housing complex has expanded to the size of a city, is still growing, and can't be shut off. It's an ecological disaster that threatens to restart the conflict, and Stake has to stop it.

This sequel to *Deadstock* can be read as a standalone, but you'll enjoy it a lot more if you read that first—there's a lot of backstory here. Stake is an interesting character, and like all great modern detectives, he grapples with the moral dilemmas of a case, and this one has plenty. *Blue War* isn't perfect; the story depends on an otherwise cynical and calculating realist being an emotional idiot when it comes to his lover, and though that situation certainly occurs in real life, it grates a bit when it happens so consistently in ways that advance the plot. This aside, the alien society is well crafted, the tension of a community that has recently been at war is palpable, and the fast-paced adventure stays lively right to the end. Fans of SF that merges thriller and detective elements will find Blue War a very worthwhile read.

* * * *

The turbulent worlds of Blue War are party planets next to the settings for **Death's Head: Maximum Offense**, which might have been named because some people will find this book maximally offensive. It is the sequel to *Death's Head*, in which we first met Sergeant Sven Tveskoeg. He is brutal, vulgar, and prefers prostitutes to other forms of relationships because he only understands social rules when money changes hands. His only redeeming characteristics are his intelligence and his loyalty to the soldiers he leads, but both of those are in the service of a corrupt officer corps led by a capricious general who follows the whims of a psychotic emperor. In practice, this means that Sven is often extracting himself and his troops from bad situations caused by stupid orders.

The unschooled but smart noncom who succeeds despite his superiors is a common trope, but one which can still come to life when well handled. For my tastes, it isn't in this book, primarily because the level of graphic violence is distractingly excessive. Open this book to almost any page and someone is getting killed, maimed, or raped, and details are not spared.

This isn't to say that this book is just a gore-fest—there is a plot in here, a good one involving political intrigue, mutated humans with strange powers and inexplicable agendas, a talkative, sardonic gun, and an intelligent and lovingly protective space habitat. There are a few characters we might like to know more about; Sven's motley crew includes several people who are more interesting than he is. David Gunn can certainly write, and there are many possible lessons in the story of an animalistic but smart warrior who

serves a complex society but is more at home among savages and primitives. None of those ideas are explored here, unfortunately—this book is a simple military thriller with no time or interest in big ideas. Perhaps those will be explored in one of the inevitable sequels that this book will spawn. The luridly detailed violence is what most readers are more likely to remember about *Maximum Offense*.

* * * *

There is violence aplenty in Karl Schroeder's **Pirate Sun** too, but it is less graphic and happens amid a setting that is far more interesting—a vast space habitat that works at a pre-industrial level thanks to an artificial field that makes advanced electronics useless. Thus there are primitive jets but no radio, spinning cities in space held together with ropes and wood, pedal-operated spacecraft, and a whole array of implausible but delightful adaptations to a unique environment. We were introduced to this collection of floating worldlets in *Sun of Suns* and *Queen of Candesce*, the previous books in the series, but there are plenty of new consequences of living in this weird setting, and they're lovingly explored here.

The plot in *Pirate Sun* is pure space opera, the characters cardboard cutouts, but made from very high quality cardboard. The ambassador is charming and devious, the admiral brave and resourceful, the plucky young crewman loyal to a fault, the mysterious female spy sensual, ingenious, and secretly troubled. Seven-eighths of this novel is a long chase scene, so most of the other characters are seen only briefly, but there are a few charming minor players. The action happens at a breakneck pace, and every few pages someone is escaping from a trap, foiling a plot, or leading a rebellion against an evil overlord. It's all great fun, with melodramatic action and even some character development. Naturally, the closing pages include the setup for another thrilling adventure—and it's one I look forward to.

* * * *

Not every sequel can sustain that excitement, and sometimes it can be interesting to analyze just why things don't work. A case in point is Brenda Cooper's **Reading The Wind**, the follow-up to *The Silver Ship And The Sea*. The first book introduced us to a group of children who had been left behind when their parents had fled after a war between two communities of settlers. The children grow up as outcasts, living reminders of a bloody war. The twist is that the hostile, intolerant natives are humans like us, while the children are genetically engineered for strength, agility, and various special skills. We sympathize with them at the same time as we understand how they are seen as a threat to people we can identify with, and it sets up an interesting tension. The characters are engrossing enough that we forgive the slow pacing and some obvious plot devices—for instance, in the opening pages someone mentions in passing the locked starship that nobody has been able to enter for twelve years. We immediately know that one of the kids is going to get inside and fire it up—the only question is what they'll do with it. Cooper does manage to pull a surprise at the end of the book regarding who does what with the ship, and the sequel begins with some of the genetically altered teenagers on the planet and some in space.

*Reading The Wind*has different flaws and different virtues from the first book. The pacing is faster, in fact too fast at times; richly detailed passages are interspersed with short sections that summarize major events. The attention to character is also uneven—the children left on the planet develop complex emotional lives as they mature, while the interactions and dynamics of the other group are underdeveloped. We're given a glimpse of what the culture of the genetically altered might be like, but only briefly, and largely as the backdrop of a chase scene. As *Reading The Wind* rushes on, new characters are introduced and discarded, improbable coincidences accumulate, and this time there's no ingenious plot twist at the finish. Everything wraps up neatly and predictably, complete with a hastily convened group of amateurs defeating an invading band of mercenaries. It's a disappointing end to what could have been a powerful work. Brenda Cooper is a talented writer, but the intricate world and involving characters she created in her first book are not well served in the second installment.

* * * *

After reading these vast sagas, it's instructive to review the briefer literature of an earlier day, as presented in the Science Fiction Hall Of Fame's collection of the **Greatest Novellas Of All Time, Volume Two-B**.* These are stories by giants of the field like Asimov, Pohl, Simak, and Vance, as well as less remembered authors. The best of these stories, like T.L. Sherred's "E For Effort," Theodore Cogswell's "The Spectre General," and Vance's "The Moon Moth," show the universal appeal of a good story well told. They have lively writing, interesting characters, and tight plots with the mandatory twist at the end. Others are worth reading mainly as period pieces, classic idea stories with as much description and as many characters as needed to move the action forward and no more. Read these to savor the days when writers wrote tight, compressed prose and a thirty thousand word story was a big sale.

* * * *

Finally, we have a nonfiction book by a writer whose name may be familiar to you, a gentleman named Stanley Schmidt who does a little editing on the side. Those of you who actually read the editorials in this magazine rather than flipping straight to the fiction already know that Stan is a scholar and philosopher of science and society. You might open this book expecting longer versions of his well-considered arguments, some gentle humor, and as much interest in defining a question as in providing an authoritative answer.

If so, you're two thirds right about **The Coming Convergence**. The authoritative voice and conversational manner are there, but less in the speculative mode than usual. That's appropriate, because this book is a history of ideas—which concepts came together to spark theories and inventions that were unforeseeable in an earlier time but are pivotal in ours. It's a very useful endeavor, outlining the ways in which geniuses, crackpots, and just plain lucky folks engaged in unwitting collaborations with each other. The pace is brisk, the inventors' backstories sometimes mentioned only briefly—the ideas are the focus here. *The Coming Convergence* is clearly written enough that it can instruct a high schooler, and in fact would be a splendid textbook to hook students on the history of scientific thought, but any adult will find new information and sparkling prose to enjoy.

[Back to Table of Contents]

Reader's Department: **BRASS TACKS**

Dear Dr. Schmidt,

I see people keep complaining about David Palmer's terse writing style.

Come on, people, get over it! Haven't any of you ever read “The Moon Is A Harsh Mistress"? If it was good enough for Heinlein, it ought to good enough for Palmer.

Pat

* * * *

Mr. Schmidt:

Concerning your editorial “Relativity” in the December 2008 issue, I think you missed an important point about respect for other people. As what's often called a strong atheist—I am firmly convinced that no supernatural entities exist—I have been accused on the various religion and atheism forums which I frequent of not respecting other people's views; more specifically, their theistic views. This is entirely correct. I have respect for (most) people, just as I hope they have respect for me, but I have no respect for theistic viewpoints at all. To put it simply, I think they're silly.

My point is that people, simply by dint of being human, are entitled to at least some measure of respect. Viewpoints and opinions, however, aren't. I see no reason why I should respect a position that I think is totally erroneous. If you want me to respect your claim that there's a God and he sent his son Jesus to be our savior, or that your god parted the Red Sea for Moses and the Jews when they left Egypt, or that Mohammed was given the Qur'an by an angel, show me strong and valid evidence. As Richard Dawkins pointed out in The God Delusion, you are not entitled to demand that I respect your position simply because it's important to you.

Richard Dalin

North Haledon, NJ

* * * *

Dear Dr. Schmidt,

Thank you for your editorial on the very difficult-to-discuss-clearly subject of moral essentials and bogus moral issues. You go remarkably deeply into the matter in a very short space, and your pointing out that equating tolerance of many kinds of differences with lack of belief is not reasonable or moral goes to the heart of the matter. Things seem to get really thorny when it comes time to draw the line between public and private matters. On the one hand, as you say, culture and explicit religion concern cohesiveness of groups, the quintessentially public matters of all public matters, while on the other, OUR culture prizes personal liberty (within reasonable limits), which implies private choice. You seem to imply but avoid saying explicitly that ALL “functional” (meaning potentially sustainable) cultures ought to prize personal liberty and private choice in personal belief and that genuine belief must be everywhere private. Slippery ground, but necessary to explore, since group living in conditions of relative want and scarcity provide fewer choices for private fulfillment than group living in conditions of relative plenty, and looking into the basic options of privacy in conditions of plenty often reveals that the choices that most concern people are indeed choices between what plentiful goods to make their personal priority and what others not to. There are, for example, numerous adherents to a version of Christianity here in the USA that teaches that the proof of Godliness (i.e., moral righteousness) is the accumulation of numerous, valuable, material personal possessions, which automatically follows from treating one's fellows selflessly and abetting group

benefits by good stewardship of material possessions, with material goods as a fundamental given. Yet privacy always does have meaning and does require respect, just as you say, which leads me to note such popular distinctions of formulated belief as that between believing "on" and believing "in," both of which refer pointedly to the morally responsible and wholly self-directed aspect of the individual person. I fear, however, that respect for reality unavoidably pushes these reflections into the shadows by forcing primacy on the values of science, which is often said to be "value-free," and, as you cite the Pope, "without meaning," but whose values depend utterly and at one and the same time on respect for both human potential and the limits of human achievement, which lived respect looks like religion! Of course, I am referring to science as an activity, not an institution.

Joseph E. Quittner

Cleveland Heights, OH

* * * *

Stan:

We shouldn't confuse "tolerance of other religions" with "moral relativism." You can practice either one without practicing the other. Relativism can be pretty intolerant. It's also useful, when the media report the sayings of pontiffs, to check out what the said pontiff said. The complete text of the sermon, translated from the Latin, can be found here: ncronline.org/mainpage/specialdocuments/ratzingerconclavehomily.htm and the empirical-minded can read it and determine whether the isolated snippet captures the gist of the sermon. (Remember, the guy's a German philosopher, so you gotta go with the flow.)

"How many winds of doctrine we have known in recent decades, how many ideological currents, how many ways of thinking ... The small boat of thought of many Christians has often been tossed about by these waves—thrown from one extreme to the other: from Marxism to liberalism, even to libertinism; from collectivism to radical individualism; from atheism to a vague religious mysticism; from agnosticism to syncretism, and so forth. Every day new sects are created and what St. Paul says about human trickery comes true, with cunning which tries to draw people into error. Having a clear faith, based on the creed of the church, is often labeled today as a fundamentalism. Whereas relativism, which is letting oneself be tossed and "swept along by every wind of teaching," looks like the only attitude (acceptable) to today's standards. ***We are moving toward a dictatorship of relativism which does not recognize anything as for certain and which has as its highest goal one's own ego and one's own desires*** *.*

However, we have a different goal: the Son of God, true man. He is the measure of true humanism. Being an "adult" means having a faith which does not follow the waves of today's fashions or the latest novelties."

Certainly, a vague Nietzschean philosophical egoism seems popular today. People talk about "your truth" and "my truth" as if there were no such thing as truth. That way ultimately lies the death of science. "I just choose!" is the battle cry—and that way lies the death of rational debate, and even of reasoned acceptance of one's own beliefs. After all, there is the tolerance that recognizes the dignity of other beliefs, and the false "tolerance" that holds them all equally worthless. Joseph Bottum, an editor over at *First Things*, had this to say about the remarks:

[Ratzinger's] difficulty is this: How can you argue in favor of argument with a people who childishly begin by arguing against the possibility of any universal truth? ... This is a theme Ratzinger has taken up before. In his 2003 collection of essays, Truth and Tolerance*, for instance, he describes John Paul II's 1998 encyclical on Christian philosophy,* Fides et Ratio *[Faith and Reason], as concerned most of all with restoring the place of truth "in a world characterized by*

relativism." He insists that Jesus Christ—the Logos, *the Word made flesh—"assures us of the rationality of the world, the rationality of our being, the divine character of reason, and the reasonable character of God, even though God's rationality surpasses ours immeasurably and appears to us as darkness." Thus "Europe must defend reason"—for "Rationality has been the postulate and the condition of Christianity and will remain a European legacy.*

It was in fact the Christians who held that much of the moral law could be discovered by reason. So when you state that nonbelievers can also behave morally, you are spouting Christian dogma regarding what they called the "natural law," and saying no more than Paul said in Romans 2.

You also mentioned the Easter prayer that Benedict reinstated "for the 'enlightenment' (read 'conversion') of the Jews." The actual text of the prayer runs thus:

Let us also pray for the Jews: That our God and Lord may illuminate their hearts, that they acknowledge Jesus Christ is the Savior of all men. (Let us pray. Kneel. Rise.) Almighty and eternal God, who want that all men be saved and come to the recognition of the truth, propitiously grant that even as the fulness of the peoples enters Thy Church, all Israel be saved. Through Christ Our Lord. Amen.

It is a prayer for salvation of "all Israel," not for the conversion of individual Jews. John Paul II's declared that the Old Covenant never has been revoked, so Catholics pray for "all Israel"—the "Israel of the flesh" *and* the "Israel of the Spirit" [i.e., Jews and Christians]—to become one once again, healing the rift within the family of Israel itself. This does not seem especially intolerant.

But if it seems odd that Catholics wish Jews to be saved, consider the *Aleinu* of Jewish services, prayed three times daily:

Therefore we put our hope in You, Hashem our God, that we may soon see Your mighty splendor, to remove detestable idolatry from the earth, and false gods will be utterly cut off, to perfect the universe through the Almighty's sovereignty. Then all humanity will call upon Your Name, to turn all the earth's wicked toward You. All the world's inhabitants will recognize and know that to You every knee should bend, every tongue should swear. Before You, Hashem, our God, they will bend every knee and cast themselves down and to the glory of Your Name they will render homage, and they will all accept upon themselves the yoke of Your kingship that You may reign over them soon and eternally. For the kingdom is Yours and You will reign for all eternity in glory as it is written in your Torah: Hashem shall reign for all eternity. And it is said: Hashem will be King over all the world—on that day Hashem will be One and His Name will be One.

This says essentially the same thing. Nothing wrong with Jews hoping that all people are saved, either.

The Crusades were not about imposing any beliefs on the Muslims; and the whole "cuius regio, eius religio" thing was actually an Age of Reason notion. But entire books could be and have been written about them, and this letter has already gone on too long.

Mike Flynn

* * * *

You're quite right that religious tolerance and moral relativism aren't quite the same and don't always go together, and that there's more to what the pontiff said than I quoted. (I especially like, and endorse, the part about the importance of a faith that does not follow fashions.) However, my object was not to critique that or any other speech of his, or the man who gave those speeches. My topic was the rather widespread thought expressed in the sentence I quoted, regardless of who holds it or in what context—and his was the most recent published statement of it I'd seen.

I agree that denying that there is any such thing as truth would lead logically to the death of science—but I still don't think I've met many people who actually make such a denial (hence my "straw man" comment). Part of the problem is that "moral relativism" is such a slippery concept and the term is used very differently by different people. If it's taken to mean "Whatever I choose to believe is right," as it sometimes seems to be, that's hard to defend. If instead it means that different rules are valid in different circumstances, that's hard to deny, unless you define your rules very broadly, with lots of corollaries and contingency clauses to cover all possible eventualities. For a prosaic example: "Traffic must stop at all intersections" is valid in a town where all intersections have four-way stops, but could cause a lot of mayhem if followed in a town where some intersections have those, others have two-way stops, others have "push-to-cross" buttons, and still others have traffic lights. You can write a rule that covers all those cases, but it's big and unwieldy: it's called the traffic code (and you still have to decide what to do in an emergency where somebody else violates it!).

Nothing wrong with anybody hoping for all people to be saved. What bothers me about both those prayers is that both wish not only for other people's salvation, but specifically for their achieving it by "becoming like me." Sure sounds like conversion to me, whether or not they advocate proactive efforts to make that happen.

* * * *

Dr. Schmidt,

I have just finished Part II of "Wake" and continue to find it the best I have ever read. Robert Sawyer has been my favorite writer ever since "Hominids" and this one delights me even more. I can hardly wait until your next issue, particularly with your odd 35-day spacing. For the first time ever, I went back and re-read both parts, which added to my appreciation of his skills.

The serial is pleasing on four levels: One, it is a crackling good story. Two, he has kept four separate threads moving along (which we hope will coalesce at the end.) Three, the number of interesting references he uses is astonishing. And four, he has introduced the exciting new concept of an entity developing within the Web. What more could you ask from a science fiction story?

I hope you will tell Mr. Sawyer how much I am enjoying it.

I just noticed that your 13.5 % increase in page size has resulted in a 22 % reduction in the number of pages. Comparing word count was not practical, but I was pleased to detect a slight increase in font size, which is a benefit to my tired old eyes.

Regards,

Bob Stanton

* * * *

Since each page now has about 17% more words, the overall reduction in content of an issue is much less than 22%.

* * * *

Dear Stan,

I've been reading *Astounding/Analog* for more than 50 years.

In the past several years, many technical errors have appeared in the stories. I concede that it's hard to catch all of them due to the limited time and staff you have available.

However, your editorial in the December 2008 had one that surprised me when you referred to “Cardinal Joseph Ratzinger.” The title “Cardinal” is attached to the last name, not the first so that the name should be “Joseph Cardinal Ratzinger” as with John Cardinal Kroll. Just because many people use the title incorrectly doesn't make it correct.

It's the same as when improperly referring to Alfred Lord Tennyson as Lord Alfred Tennyson.

In any case, I enjoy reading the magazine.

Gene Pallat

Euclid, OH

* * * *

Dear Stanley,

On receiving December's *Analog*, I went back November's to read “Wake,” part I, but paused to re-read your “Great Rush Forward.” Before rushing forward to “Wake,” I want to answer your Hat Question. It is related to the somewhat more obscure Clocks-on-Socks Question: British public school boys were once forbidden to wear socks with clocks, which they were expected to know is an ornamental design at the ankle. Nowadays that question doesn't arise: they are simply told to wear plain socks of a specific color, as are troops in the military, and for the same reason: hats or socks, uniforms spell uniformity. Another way of putting it is that coverings don't just cover: they also send signals. The wearing of a hat indoors, the banning of which you thought bizarre, once signaled that the wearer was armed (and dangerous); it still does in the US Armed Forces.

"Those service members in a duty status and wearing side arms or a pistol belt may only remove headgear indoors when entering dining, medical or FOD hazard areas or where religious services are being conducted."

—US Navy General Uniform Regulations 1101.4, Headgear: c. Indoor Wear.

But, ever since civilization began, the great rush forward has left in the dust lessons of the past, so we are condemned to learn them all over again.

Now, on to see what I can learn in “Wake."

R. Lee Montgomery,

T.Tadthong A.Meuang Yasothon,

Thailand

* * * *

The “Hat Question” really has two parts; I was mainly concerned with one and you've addressed the other. Part 1 is: Why do individual men and boys remove their hats indoors? The answer, as I said, is because the “phantom tyrant” tells them to. Part 2, for which you've provided one of several answers I've heard, is: Why does the phantom tyrant tell them to do that? The answers, several of which probably have at least some basis in fact, are historically interesting, but peripheral to my observation that people do things because “everyone says I must” when in fact few if any individuals comprising “everybody” may hold that belief.

* * * *

Dear Dr. Schmidt:

In perusing an alpha-by-title list of all the stories published in *Analog* during the Schmidt Era (an excellent era, for the most part), I have noticed a surprising number of duplicate titles. That is, two identically titled stories by two different writers, published sometimes as little as two years apart. (I have attached a complete list.) You have even bought and printed three different stories entitled “Chrysalis". No law against it, of course, but I think this practice inevitably causes some confusion and should be avoided if possible. This might be accomplished by encouraging a writer to try for another title if his story that you intend to buy has a title identical to one already used.

Other than that, no particular complaints. The slightly larger page format is a welcome reversal of the “shrinking” trend that has afflicted SF magazines since the late 1940s. Keep up the good work.

Marc Russell

Los Angeles CA

* * * *

In some cases we will make such a suggestion, but it's not a very high priority. Title plus author should almost always be enough to uniquely identify a story. Besides, we've published about 2,000 stories since I've been here, so I don't always remember a duplication.

[Back to Table of Contents]

Reader's Department: **IN TIMES TO COME**

Adam-Troy Castro is back in our May issue with “Among the Tchi,” a sneaky bit of satire that I suspect will ring a bell with lots of readers. It has a great variety of company, with stories by Tom Ligon, Alexis Glynn Latner, Robert R. Chase, Shane Tourtellotte, and Steven Gould featuring an invigorating mix of adventure, alien worlds, and a touch of romance, among other things—always including, above all, imagination and thought-provoking entertainment.

Richard A. Lovett's science fact article has a very long title, beginning with “Geology, Geohistory, and ‘Psychohistory,’” but the essence of it is the perennial debate between “uniformitarians” and “catastrophists": scholars who see history in terms of broad, long-term trends and those who see it in terms of sudden pivotal events. As usual, such a dichotomy is an oversimplification, and the truth is more like this....

[Back to Table of Contents]

Reader's Department: **UPCOMING EVENTS** by Anthony Lewis

24-26 April 2009

Odyssey Con 9: Year of the Cow (Madison area SF conference) at Radisson Hotel, Madison, WI. Guests of Honor: Emma Bull and Tobias Buckell; Fan Guest of Honor: Georgie Schnobrich. Membership: $35 [$25 student] until 10 April 2009; $45 [$35 student] at the door. Info: www.oddcon.com; oddcon9@oddcon.com; (608) 772-4455; Odyssey Con, PO Box 7114, Madison, WI 53707

30 April-3 May 2009

2009 Eaton Science Fiction Conference (Academic SF conference) at University of California, Riverside. Theme: Extraordinary Voyages: Jules Verne and Beyond. Presentation of the Second Eaton Lifetime Achievement Award to Frederik Pohl. Membership: $125 for 3 days, $55/day, $25 student-checks payable to UC Regents. Info: eatonconference.ucr. edu/; eatonconference@ucr.edu; Special Collections, Rivera Library, UC Riverside, PO Box 5900, Riverside, CA 92521-5900, attn: Sarah Allison; (951) 827-3233.

22-24 May 2009

ConQuesT 40 (Kansas City area SF conference) at Hyatt Regency Crown Center, Kansas City, MO. Guest of Honor: John Scalzi; Artist Guest: Oberon Zell; Anime/Media Guest: Jerry Gelb; Fan Guest: Ed deGruy; Toastmaster: Ellen Datlow. Membership: $30 until 1 January 2009; later to be announced. Info: www.conquestkc.org/; ConQuesT 40, P.O. Box 36212, Kansas City, MO 64171

22-24 May 2009

OASIS 22 (Orlando area SF conference) at Sheraton Orlando Downtown, Orlando, FL. Writer Guest of Honor: Peter David; Special Guest Writer: John Ringo; Editor Guest of Honor: Toni Weisskopf; Artist Guest of Honor: Johnny Atomic. Membership: $35 until 30 April 2009, $40 at the door. Info: www.oasfis.org/oasis; OASFiS, PO Box 592905, Orlando, FL 32859-2905.

5-7 June 2009

SOONERCON 2009 (Oklahoma SF conference) at Oklahoma City, OK. Guests: Eric Flint, Selina Rosen; Artist Guest of Honor: Brad Foster. Info: www.soonercon.info; info@soonercon.com; SoonerCon, c/o Atomic Comics, 6006 S Western, Oklahoma City, OK 73139, (405) 632-2848.

6-10 August 2009

ANTICIPATION (67th World Science Fiction Convention) at Palais des congres de Montreal, Montreal, Quebec, Canada. Guests of Honor: Neil Gaiman, Elisabeth Vonarburg; Fan Guest of Honor: Taral Wayne; Editor Guest of Honor: David G. Hartwell; Publisher Guest of Honor: Tom Doherty; MC: Julie Czerneda. Membership: until 31 December 2008 (see website for latest details): CAD/AUD 215, USD 190 GBP 110; EUR 130; JPY 23000; supporting membership CAD/AUD 55; USD 50; GBP 25; EUR 35; JPY 6000. This is the SF universe's annual get-together. Professionals and readers from all over the world will be in attendance. Talks, panels, films, fancy dress competition—the works. Nominate and vote for the Hugos. Info: www.anticipationsf.ca/English/ Home. C.P. 105, Succursale NDG, Montreal, Quebec, Canada H4A 3P4

4-7 September 2009

North America Discworld Convention (conference dedicated to Terry Prachett's Discworld books) at The Tempe Mission Palms Hotel, Tempe, AZ. Guest of Honor: Terry Prachett; Other guests: Esther Friesner, Diane Duane, Peter Morwood. Info: www.nadwcon.org, info@nadwcon.org, (480) 945-6890, North American Discworld Convention 2009, c/o Leprecon, Inc., P.O. Box 26665, Tempe, AZ 85285.

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