

Second Chances

By Karyn B. Baker

I never leave anything on the nightstand. Ever. So when I reached for my glasses that morning, I was surprised by the piece of paper underneath them. A pamphlet for CyLife. *Mandi*, I thought. I put the pamphlet down again. I didn't want to think about it.

It was my normal waking hour. 5:15 am, even without the alarm. Routine took over. Feed the cat. Shower, shave. Suit and tie. A breakfast of egg whites, fruit and low-fat cottage cheese. Then I remembered I wasn't supposed to go to work that day.

Uncertainty crept in, and I returned to the pamphlet on my nightstand. Smiling, happy families. Survivors, supposedly. People who had benefited from CyLife's "revolutionary techniques." I wondered how many of them were actors. Maybe all of them. Charles had told me the procedure was experimental, but he wouldn't tell me how many patients had survived the operation. That meant not many.

The phone rang, and I answered it. My sister Sarah was at the airport; the red-eye had landed on time and she was about to board the puddle jumper that would bring her to town. "How are you holding up?" she asked.

"OK," I answered, staring at the open pamphlet.

"Any news from the hospital?"

"No." I said. "Nothing." I sank down onto my bed. She must have heard something in my voice.

"I'll be there, soon, John. Hang in there, OK?"

"OK," I choked out.

"I'll meet you at the hospital. Give me some time to get my luggage and grab breakfast. I should be there by 9 o'clock."

"Sure," I said. *Click.*

Bump. My daughter's cat looked up at me from the vicinity of my ankle, then looked toward Mandi's room, across the hall. *Where is she?* He seemed to ask. *Why isn't she getting ready for school?*

I swallowed. "She's not here, Skimble," I said. *She might not come back either*, I thought, cringing. When he meowed in reply, I said, "We'll get her back soon. I promise." I looked down at the pamphlet. *Maybe*, I thought. *If I decide to go through with this. And if it works.*

I turned back to the living room and spotted my briefcase in its usual place by the front door. Routine. I craved it. The deadlines piling up at work called to me. I'd been ignoring them, but they were still there. Sirens of certainty; beacons of habit. Skimble walked past. He curled up in a patch of light, ready to settle into his daily routine. That's when I made up my mind. I stuffed the pamphlet into my briefcase and headed for the office.

At work, I didn't talk to anyone. I immediately shut the door to my office and closed the interior blinds – our universal do not disturb signals. Unsure where to begin, I opened my briefcase and pulled out the CyLife brochure, then put it aside and turned on my computer. Two days of email disappeared over the next several hours, as I rescheduled meetings, replied to simple questions, and created a list of projects that I needed to delegate. I had finally relaxed into my chair and was thinking about a cup of coffee when I heard pounding on my door.

Sarah didn't wait for me to answer, or even get to the door. She walked right in, leaving the door open so my coworkers could hear every word.

"John," she said, her jaw set and her eyes flashing. "*What* are you doing here?"

I swallowed. "Working," I said. I'd never been able to lie to my sister.

"And why are you doing that?" She stepped toward me. I backed away. Into my office. "We were supposed to meet at the hospital." Some of my coworkers paused behind her, curious.

"I, um, I thought I could catch up on some work before you got here." She nodded. Twice. At the second nod, I backed up again and bumped against the desk. "I guess that wasn't such a good idea."

"No," she said quietly. "It really wasn't. Your daughter is in the hospital. When I spoke to you last night, you weren't sure when she'd regain consciousness. If ever. She needs around-the-clock care and monitoring from the medical team, but *you* chose to go to *work*." My colleagues – and I – cringed at the venom in her voice. I swear she spit the last word.

"But. . . Well," I looked around helplessly. I was trapped between my sister and the desk. My colleagues stared back at me, confused and uncomfortable. I wished they'd walk away. Especially because I couldn't.

"We're going to the hospital now." She reached for my coat and handed it to me.

"But, Sarah," I sputtered, pushing the coat away. "Just a few more minutes and I'll be caught up on everything."

She shook her head. "Remember when Judy was in the hospital, dying, and you were up all night with her? Well, now it's your daughter's turn. *Her* daughter's turn. We're going to the hospital." She pressed the coat into my hands again and held onto my arm, ready to drag me out.

"But," I protested, pulling away from her half-heartedly, glancing over my shoulder at the desk. It wasn't work that caught my eye; it was the CyLife brochure.

Sarah shook her head, walked behind me and pushed me out of my office. She turned around to pick up my briefcase; the CyLife brochure was left behind as my sister escorted me down the hall, past my gawking coworkers, and to her rental car.

Nothing had changed at the hospital. The same equipment surrounded Mandi, the same sounds, the same beeps and whirrs of the machines that kept her breathing and monitored her heart rate, her blood pressure and who knew what else. Her 12-year-old body was unresponsive; my daughter lay there, unmoving, unseeing, unaware of the machines, of the doctors and nurses bustling around her. I wished she could sense that her father and aunt were here to see her, or that she could enjoy the flowers, stuffed animals and balloons sent by her sixth grade class, but Mandi wouldn't be enjoying them anytime soon. Nor would she see a huge bouquet of yellow roses, from CyLife; I was almost grateful for that mercy.

Charles had been waiting for us at the hospital, ready to talk to me again. "Mr. Smith," he said when Sarah and I met him in the lounge he'd commandeered. "So nice to see you again. And Mrs. Smith?" he looked at Sarah expectantly, smiling too broadly.

"This is my sister, Sarah," I answered. "Sarah, this is Charles. He's with the company I mentioned last night."

Sarah frowned. "What was the name again?"

"CyLife," Charles replied promptly. "We specialize in organic cybernetics and biorobotic solutions. Technology that's revolutionizing the medical industry."

Industry. As a parent, I should have zeroed in on *solutions*, but it was *industry* that spoke to me right then. He wasn't here to help Mandi; he was here to make money for his company.

"And what is it you think you can do for us?" As usual, Sarah was skeptical and to the point, one of the things I loved most about her.

Charles gestured that we should take a seat; the three of us were the only ones in the waiting area. We sat on the sofa, he sat in a chair on the other side of a coffee table. He pulled out another brochure, identical to the one left at work, and put it on the coffee table in front of us.

"Groundbreaking technology," he began, "has advanced prosthetics to previously unimaginable heights." He opened a small computer, and a video began to play. As we watched a demonstration of prosthetic arms and limbs that amputees could manipulate through nerve pulses from the brain, he explained. "We've gone beyond replacing limbs now, John. Sarah," he nodded at my sister, then looked back to me. "We're finally to the point that we can replace an entire human body." He paused, smiling triumphantly, as if he was somehow responsible for the achievement.

"What do you mean?" Sarah remained skeptical. "How will prosthetics help Mandi? She can't even breathe on her own."

Charles moved to the edge of his chair, leaning towards us. "It's beyond prosthetics, Sarah. Traditional prosthetics replace a single limb, a piece of the body that is missing after injury or amputation." He paused, eying the two of us intently. "This is a full-body replacement. The stuff of science fiction, until now."

"You mean, an artificial body?"

Charles nodded enthusiastically. "That's *exactly* what I mean. In Mandi's current condition, it's the best hope of her returning to a normal life."

How normal? I wondered. *How normal would it be to go back to school in a body that isn't organic? To be a machine.* I couldn't say it out loud, though.

"So, she'd be a cyborg?" Sarah frowned. "How normal is that?"

Charles leaned back. "Think of the kids in school who have the latest technology – the newest computer, the newest video game. She'll be like that – the newest medical advancement. Like when someone shows up on crutches, and everyone wants to try walking with them. Only, they won't be able to use her body. It's a permanent connection," he explained, almost apologetically. "Once the operation is complete, no one else can use that equipment."

"OK. So we're talking about an artificial body for Mandi?" Sarah frowned at the video. "These images are just prosthetic limbs." She looked at Charles. "Don't you have any interviews with people who have gone through what you're recommending for us? For Mandi?"

Charles didn't miss a beat. "Privacy concerns," he replied promptly. "We don't have any families who have agreed to share their information yet." *Of course not,* I thought. *You're probably hoping we'll be the first.*

"Families?" Sarah asked sharply. "Has this procedure only been done on children?"

Charles smiled, "You're quick." I rolled my eyes. Salesmen are always underestimating Sarah. "Yes, at the moment we recommend the procedure only for children. We find that adults are resistant to the rehabilitation process – learning to cope with a new body is challenging, to say the least." He smiled his salesman smile again.

Sarah looked thoughtful. "So she'll have to spend time learning to use this new body?" Charles nodded. "How long does that take?"

"A few months. Mandi is lucky, because the neurological damage is such that we can preserve the maximum amount of organic material possible." He paused to let us assimilate that; Sarah seemed to have run out of questions.

"What about the psychological impact?" I finally voiced the concern that had made it hard for me to sleep the night before. "Will you be able to help her with that? How much of her personality will still be there?"

Charles' smile brightened. "In Mandi's case, we don't expect any impact to her personality; she's young enough that I'm confident we'll be able to guide her through the changes. And, don't worry, rehabilitation and counseling are included in the price, no matter how long it takes."

"What price is that?" Sarah asked, looking at me before returning her attention to Charles. "How do you expect us to pay for this? I doubt insurance will cover it."

Charles shook his head. "No, of course not. It's still an experimental procedure, and insurance doesn't cover those." Sarah raised an eyebrow; she'd heard me vent about medical companies bullying insurance companies – and governments – into paying for experimental procedures. She was probably wondering why CyLife wasn't taking that angle. I had my suspicions; it was probably another reason they weren't targeting adults.

"We have a special payment program," Charles explained. "We spread the payments over the lifetime of the patient – like a home mortgage." A simplistic analogy. I doubted he understood the word *amortize*, but decided not to push it. I left the sofa to stare out the window while Sarah kept up the conversation.

"Go on," Sarah said. She wanted the details.

"John will handle the payments until Mandi turns 18, and then she'll assume responsibility, though John can continue to take responsibility until she's 25, if he wants to. He can also create a trust fund to make the payments for her after then; our lawyers will help you set it up."

"How long does she have to make these payments?" Sarah asked. The deal-breaker was coming up, as far as I was concerned.

"For the rest of her life. It's a win-win proposition. It allows you to afford the procedure, and we have every incentive to make sure she's alive and functional for as long as possible."

Functional. Not well or healthy, but functional. One little slip in his well-prepared sales pitch that told me more than I wanted to know. I wondered if the payments would be adjusted over time; I hadn't asked the day before. Sarah was one step ahead of me. I turned around to hear the answer.

"Of course," Charles said. "Inflation over one person's lifetime is considerable, so the payments will be adjusted periodically based on the Consumer Price Index."

One person's lifetime. The words echoed in my mind, and I had to ask. "How long is she likely to live, if we go through with this?"

"The procedure is new, of course, so we don't have a lot of test data, but we expect a few decades, at least."

I didn't like that answer. They had to have a better estimate than that, if they'd calculated a regular payment schedule to cover the cost of the operation. What was the break-even point for CyLife? How

long would Mandi have to live for them to start earning a profit on this procedure? As a salesman, Charles probably didn't know. Or wasn't allowed to tell us.

Sarah had a different concern. "If she's not in an organic body – can't she live forever?"

Charles shook his head. "No, it's not that simple. How many machines do you know of that last forever, even with regular maintenance and replacement parts? Not many, so we can't guarantee that the equipment will work forever. Of course," and he flashed his salesman smile again, "we'd love to offer that possibility, and if it's ever a reality, our payment plan gives us every incentive to make it available to Mandi."

Even if the payments aren't enough to cover the cost of the new technology? I wondered to myself.

Charles coughed to get my attention. "We're getting ahead of ourselves. John, have you decided if you want to go ahead with the procedure? I don't want to pressure you, but it's best if we begin the operations within 72 hours of the initial injury, which doesn't leave us much time to get the surgeons and equipment in."

My sister started and looked to me wide-eyed. I hadn't told her about the deadline. "I haven't decided yet," I said quietly. Sarah held my gaze, and nodded.

"I think," Sarah said, turning back to the salesman, "that we need some time to talk it over first. Alone," she added.

"Of course," Charles bobbed his head. "I'll be waiting in the hospital cafeteria if you need me. I'll come find you in an hour or so, all right? That will give us enough time to get everything set up for optimal results; if we wait longer than that, I'm not sure we'll be able to successfully complete the operation."

Sarah nodded absently. She'd already walked to the window I was still standing at.

We didn't talk for a while; we stood side by side, gazing out the window at the autumn trees. They'd lost their leaves and were getting ready for winter snow. Silence echoed the emptiness outside; in here, we couldn't hear the machines that were keeping my daughter alive.

"What do you think of this procedure?" she asked, breaking the long silence.

"I don't understand it completely," I said evasively. "It's . . . new." I didn't take my eyes from the barren trees.

She stepped back to the coffee table and picked up a brochure, frowning. "So you're not sure you can trust it?"

"It's not quite that," I started to answer her, but couldn't finish. I wasn't sure what I wanted to say.

Sarah put the brochure down, and walked back to me. "It could be false hope," she said. "It doesn't sound like they've done this often, and it sounds too good to be true. There may be risks or side effects

they're not telling us. What if you decide to do this, and she winds up worse off than she is now? If that's even possible," she glanced back to Mandi's hospital room.

I thought about that as I walked back to the couch. "What side effects?" I replied as I sat down again. "She won't have a natural body anymore. Who knows anything about how that will turn out? Will she get sick? From what?" I looked at the brochure. "Would it be illness, or mechanical failure?" I wondered aloud. "Should she have health insurance, or a warranty?"

Sarah looked surprised. "I hadn't thought of that," she admitted. "I assumed CyLife would cover any problems that come up. After all, they'll want to keep her healthy for as long as possible."

"Not healthy," I clarified. "Functioning." I turned to my sister, looking for support. "They don't even think of her as *human*," I argued. "After this procedure, would she be?" I closed my eyes and took a deep breath.

Sarah put a hand on my shoulder. "Is that really the issue, John?"

I looked up at her. "No." My eyes were watering. "But it's part of the consequences, isn't it? I can't let my daughter live like she is now, but I don't want to sign her up for something that's so completely . . . *unknown*, either." I turned back to the brochure, blinking to clear my vision. Shaking my head didn't help either. I looked back at Sarah. "And what if CyLife goes out of business? Who will know how to treat any issues she has then? Or, worse, what if they decide it's just not profitable to keep her alive anymore? Who will keep them honest?"

Sarah sat down next to me. "OK," she said, putting her arm around my shoulders. "There are a lot of unknowns with this. But maybe were worrying too much about the future," she said, hugging me tighter. "Think about now. What's best for Mandi right now, in the present?"

"Right now?" I echoed. I looked back out the window. That was easy. "Anything is better for her than what she's got right now."

Sarah nodded. "Then I think that's our answer, right?" I nodded, tears finally streaming down my face; that was my decision.

We found Charles in the cafeteria, as promised. He was delighted by our choice, of course, and made a few phone calls to get everything in order for Mandi's operations. After a marathon of signatures, he assured us that the procedures would begin that evening, and suggested that we bring some of Mandi's personal possessions to the recovery and rehabilitation ward, so she would feel more at home there. It would aid her recovery, he told us, if she had a cheerful and welcoming atmosphere. So Sarah and I left Mandi at the hospital – there was nothing more we could do for her there – and went home to pack up her belongings.

Mandi's room was a mixture of mint green and earthy brown. Not that I understood colors particularly, but she had always insisted on describing it that way. Framed posters of horses decorated the walls, and she'd begun stenciling wildflowers around the closet door. Sarah began packing up clothing, stuffed

animals and other girly items that baffled me. I turned to Mandi's desk, thinking she might want some books to read as she recuperated in CyLife's rehabilitation center.

A few titles caught my eye – *The Secret Garden*, *Black Beauty*, *The Call of the Wild* – before I noticed a shoebox decorated with stickers and ribbon. Her memory box, she'd called it. Judy had started it with her when she turned five. I'd forgotten about it, but Mandi clearly hadn't. The box was nearly full now, seven years later.

I opened it slowly, not wanting to invade my daughter's privacy. Perhaps something in here would give me a clue as to what she would want most when she woke up from the operations. A few ribbons from art competitions, a page from a coloring book, some stones from a creek bed. And, wrapped in tissue, a framed photograph of the three of us, from shortly before her mother's death. We were on a camping trip, in front of the tent. Mandi, sitting on Judy's lap, was playing with a plastic pony. I sat down in the chair, stunned. My wife and daughter were staring right at me, smiling, laughing. The way they always had when we were outdoors. In the aftermath of Mandi's accident, I'd forgotten how much she'd missed those camping trips, and the horse she'd been begging for; Skimble had been consolation, but I'd been planning to give her riding lessons for her next birthday. Here I was, in her room, surrounded by talismans of all the activities she and her mother had both loved. And I'd just agreed to a procedure that might prevent Mandi from doing them.

"I'm not sure I can do this," I said abruptly.

"Do what?" Sarah looked up from the dresser. I looked past her at the mirror. Snapshots of horses framed the sides.

"How can I put Mandi through this?" I gestured the photographs. "She loves the outdoors, Sarah. How is she going to feel when she wakes up and finds out her new body might not be able to do all this?"

"But she *will* wake up, John." Sarah frowned at me worriedly. "That's why you're doing this."

I shook my head. "How am I supposed to look her in the eye – a *robotic* eye – and tell her she might never go camping again. Or ride a horse? Or draw? Will she have enough coordination to draw?" I stopped to look at her stencil-work – really look at it, for the first time. It was good. "That's what she enjoys most. Not academics, not reading. Not things that will be easy to do in a delicate, untested body."

"John," Sarah said slowly, putting down the shirt she'd been folding and walking over to me. "She may not be able to do any of those things again, whether you go through with this or not." She looked down at the photograph, smiling as she turned it to face her. "Mandi will always have these memories, John. Don't worry about the future; you'll find a way to make sure she's happy."

I looked around the room again. Memories. Sarah was right; Mandi would still have those memories. More importantly, she and I had a chance to make new ones. As soon as the surgery was over and I was allowed to see her again, I'd do everything in my power to make sure they were good. I put the picture back in the box, closed the lid, and placed it back on her desk; she wouldn't need it for a while.

RISK MANAGING AN INVESTMENT PORTFOLIO

By Jerry Tuttle, FCAS, MAAA, CPCU

Forget all those courses and designations. Risk management? Who is better than I am? If by “managing risk” we mean minimizing volatility, and in particular Value at Risk and down-side variability, I have successfully managed to minimize just about all the risk in my personal stock portfolio.

Let me tell you what stocks are in my personal portfolio. I have one insolvent company; my broker said he would buy back my 1,250 shares for a dollar – not a dollar per share – a dollar. I have one financial company that had been trading below a dollar a share, so it couldn’t go much lower, until the reverse stock split showed on an adjusted basis it could in fact go lower. I have a satellite radio stock because my kids convinced me that satellite radio couldn’t miss – it’s also trading below a dollar a share. I have what used to be a rock-solid diversified manufacturing company that is just barely trading above single digits. And I have another stock that trades in the most narrow range you can imagine.

I would think the beta (β) of this portfolio is pretty close to zero; it doesn’t matter what the market does, this portfolio doesn’t move. And it certainly doesn’t have much room to go any further down.

I always thought that building up a stock portfolio would eventually make me wealthy. Now that I am getting closer to retirement, I realize that I need to do something drastic to make this portfolio grow.

There are over 20,000 unique American Academy, SOA and CAS members. Most of them probably have decent incomes, and nearly all of them list their e-mail addresses. Despite our finance training that says you can’t consistently beat the market, I think every actuary has a nagging feeling that somehow he or she really can. I need to tap into that feeling.

I thought about that last stock I hold, BJR, currently trading at 20. Not only does it trade in a microscopically narrow range, but very few shares trade at all. I decided the time had come to truly manage my risk: If I thought the price of BJR was going up, I should buy call options to buy more BJR at a strike price below the price the stock would rise to, and then sell my new shares plus my existing shares right away to lock in my profit.

So I devised a plan. I bought the e-mail addresses of the 20,000 actuaries¹. I chose five stocks from the S&P Small Cap Index: Albuquerque Robotics, Outer Banks Airlines, Marlana Cosmetics, Quintone Publishing, and Lipdom Properties. I chose these from largest to smallest – few people probably even know of these last two. Then I bought 250,000 call options to buy BJR at 20.25 – it was not very expensive to buy the options considering the small increment on the price range.

Next I sent the following e-mail at 8:00 a.m. Monday to half of the 20,000 actuaries:

¹ This is a work of fiction. The SOA does not sell its member list.

“Most of you don’t know me, but I am a fellow actuary. I have a database of over 5,000 stocks. Using techniques of Generalized Linear Modeling, once in a while I believe I can make a very short-term prediction about the movement of individual stock prices, that I would like to share with you. More specifically, I can find one stock in my database that I am willing to make a forecast on for five days from today. Right now, I am thinking that the stock price of Albuquerque Robotics will be higher at the close on Friday this week than it is right now, at this morning’s opening. I am not asking for any money from you, and I am not asking you to even believe me. Just watch the price on Friday.”

Then I sent the identical e-mail to the other half of the 20,000, except that I changed the key sentence to “the stock price of Albuquerque Robotics will be *lower*.”

By Friday, the price of Albuquerque had gone down. I discarded the first 10,000 e-mail addresses, to whom I had given the inaccurate prediction. I took the second 10,000 addresses, and on 8:00 am Monday I sent half of them this e-mail:

“Last week I sent you an e-mail predicting the price of Albuquerque Robotics would go down by Friday close, and it did. This week I like Outer Banks Airlines, but I like it to go up. I am not asking for any money from you, and I am not asking you to even believe me. Just watch the price on Friday.”

I sent the identical e-mail to the remaining 5,000, except I predicted Outer Banks would go down.

By Friday, the price of Outer Banks had gone up. I discarded the 5,000 addresses that I given the wrong forecast. I began week 3 with 2,500 addresses to whom I predicted Marlena Cosmetics would go up, and 2,500 to whom I predicted Marlena would go down.

You can see the pattern and do the math. By week 6, I was down to $20,000 * (1/2)^5 = 625$ addresses. This time I did not split the group in half, but I sent them all this e-mail:

“Dear Friends. For the last five weeks I have sent you five consecutive accurate predictions of individual stock price movements. Before I give you my prediction this week, I need to tell you that this will be my last prediction. I have mined my database as much as I can, and there are no more stocks that my model seems to work well on. Nevertheless, here it is: BJR will go up this week.”

I set my Internet browser to Yahoo Finance, where I could watch the real-time price movement of BJR. Of course, as usual, nothing happened. Oh, it moved randomly up and down by two cents every now and then, but by 4:00 p.m. Monday very few shares changed hands and the price was still 20. By 4:00 pm Tuesday nothing changed. Suddenly Wednesday afternoon some shares of BJR started moving. The price started inching up. Did some of my 625 e-mail recipients decide to act on my forecast? On Thursday a lot of BJR shares started moving, which was unusual for this stock which normally had very little activity. Perhaps the original 625 were inducing others to buy. There were more buyers than sellers, and the price started to rise. By Friday at 3:45 p.m. BJR was trading at over 25. I quickly exercised my call options. Then I sold the stock right away.

I was about to calculate my profit when the phone rang. It was an investigator for the Securities and Exchange Commission. The SEC had been monitoring me. That said my

activities were suspicious, and they told me to meet with them at 9:00 am Monday in their offices.

I brought my lawyer with me to their office on Monday. The SEC accused me of securities fraud. They said what I had done is called “pump and dump – buy, lie, and sell high.” But I had worked this out with my lawyer long before I sent my first email.

I explained that I provided predictions, not recommendations. I did not do this anonymously. I did not have insider information. I did not charge money for my predictions. I can provide the equations that back up my predictions. I was stalling on this last point, but I knew I could back into some equations – given enough variables, you can predict anything with multiple regression.

You could tell that the SEC lawyers were not pleased with this explanation. But I had sneaked between the cracks of their rules, and they let me go with a warning not to do this again.

I had made a nice profit on BJR. Maybe it was time to retire from actuarial work. I have always been fond of Albuquerque. I wonder if I could get some part-time work at Albuquerque Robotics?

END

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Author’s note: This is work of fiction, and the events are fictional. The author does not sanction giving stock advice and manipulating the stock market.

Everything's Relative

by Nathaniel Smith

Inspired by Peter Faber

I.

The rain hit the windows in sheets, forming spirals that spread over the glossy finish. While outside the office was a tumultuous windstorm, inside was anything but. I watched the rain hit the window and thought about my life. I found myself doing that more often, after the death of my high school friend, Terry, a week ago. I had been best friends with Terry in high school, but we had grown apart after that. I remembered going over to Terry's house to play Halo and watch movies when we were younger, and then moved on to beer and parties as we grew older. We drifted apart when I was in college, and he dropped out. I focused on my future and my girlfriend, and honestly never paused to think about what I had done. He had simply passed out of my life like a ship in fog, but looking back he should have been so much more.

If only I had taken a second, maybe shot him an email, I thought, maybe I could have...

"Do you have that report yet, Tom?" Tanya asked. She walked into my cube, bringing in a breath of jasmine. Tanya is a bright young Indian woman, who at age 28 was the firm's youngest F.S.A. and the newest member of the management team.

"Oh yeah, Tanya, I have it. I just got it back from typing. I have to check over my changes, and I will have it over to you this afternoon," I replied, moving my eyes back my computer.

"Okay," she said, and then, "are you in for Softball tonight?"

"If it stops pouring out," I laughed hollowly, but she was already moving. I moved my hands down over my crisp blue striped shirt and looked around the bare walls of my cubicle. From the other side of the office, I could hear the soft chatter of people discussing the local sports team. In the next cube over I heard a cough. I closed my eyes for a second, and just take it all in. Normally when I had trouble concentrating, I would take a walk down on the streets and go to my favorite corner cafe to grab a coffee or an ice tea. That was not an option in this weather though. I opened my email and looked it over, but I found nothing meaningful, nothing even trivially distracting, and that meant I would have to dive back into my report.

The power went out. The main lights dimmed down for a second, and my computer powered down. Great, I thought, it will take me at least fifteen minutes to get logged back in. I was the newest member of Employees Management Group, and the only member who still had an old tower. Everyone else used their laptops, which we could take home to continue working. Supposedly, my laptop was on order, so I was forced to use the ancient machine. People were vacating their cubes now, some laughing, others getting freaked out because they hadn't saved their work in a while. I just sat back and tried futilely to relax.

I still remembered folding open the paper last week and seeing the picture of my former best friend. "Brutal Murder rocks College Campus" read the headline. I had the article memorized as I had read it dozens of times. Apparently Terry had started seeing a girl, not knowing she was seeing someone else. That someone else had found out, and brought two of their friends over to Terry's apartment. They had taken him out, struggling. Witnesses thought it was a fraternity trick. What those three men did to Terry was horrendous. He had been alive for almost three hours while they had fun with him, and then

he mercifully died. The three men were to be arraigned in the courthouse downtown tomorrow, after getting caught because they had bragged about the crime on Facebook. Apparently the police had taken plenty of evidence from the killers' apartments.

Maybe I should go there and at least see them, the bastards.

The power spit back on.

"Tom, you got a minute?"

Great, I thought, Sebastian again. This guy will not get off of my case.

Sebastian was on the other side of forty with a thick stomach and a goatee that was graying rapidly. He basically lived at the firm, working almost 70 hours a week in the office. Occasionally he would spend the night in his office. Rumor had it that Sebastian and his wife of twenty years are getting a divorce, but that same rumor had probably been circulating for the past half decade.

"Can you come into my office?"

I get up and follow Sebastian to his office. Sebastian waits until I am in his office, and then closes the door behind me.

"Tom, what is going on? Your work lately hasn't been up to par. You are making the same mistakes a first year actuary would make. I notice you have been leaving a bit early. Maybe you should stay later and check your work a bit."

I almost opened up to him, but took a moment to look around the man's office, seeing the same faded pictures of his kids that have hung in the office for years, seeing the dust that was collecting on the piles of papers that covered his bookshelf like moss on fallen tree. There was a browning plant in the corner that was receiving too much sunlight and not enough water. I almost told Sebastian about Terry, but knew that the other man would never understand. Sebastian could pretend to care, but to be honest, I thought, the work had consumed him.

"You're right Sebastian," I said, trying to control the tremble in my voice. "I will be more careful next time."

"You'll get your chance right now. We screwed up the statements for AmCo. You need to go into the file and fix them. I will forward you the email." The way he said "screwed" sounded like a snake trying to hiss around a dead mouse in its throat.

Oh God, I thought. AmCo had the worst pension plan in the office. Their data was always a mess. I wondered what was messed up.

"I'll look at it first thing tomorrow."

"You'll look at it tonight, Tom, and all of the hours will be non-billable. You just cost this company a lot of money, Tom."

Say my name again jackass, I thought, and I'll...

"I'll get right on it then," I said, and almost dashed out of the office. I went back to my cubicle, fired up my email, and emailed Tanya about the softball game. I would obviously not be making it. I pulled open the AmCo email that Sebastian had forwarded, and started looking at the changes. When a company has a pension plan, there is a requirement that every year a statement goes out to the participants detailing their benefits under the plan. AmCo had almost seven hundred active participants, and each one gets a separate statement. There were several minor changes that probably could have been ignored, but there were a few flaws that were central to the statement process. As I looked over the file, I heard the rustling of papers and the fading of voices as the other associates left for the day. Then I heard footsteps coming towards my cube.

Sebastian came in, his coat on. "Oh good, you are looking at the file. I want it on my desk when I get in. I have a town Council Meeting, or I would of course be staying late myself."

“Hey Sebastian, you have a great night, okay?” I did not look from my computer screen.

“Tom, you have a productive one,” Sebastian replied, snorting back a laugh, and with a flourish was gone.

II.

It was three hours later, and I still was finding problems with what should have been a very routine process. Although the data for AmCo was complex, the process for generating the statements was fairly routine, and this was my third time using the spreadsheet. Most of the problems seemed to deal with manual changes to formulas. I was tempted to just start over, as I honestly did not remember making the changes to the spreadsheet. I wondered if possibly Sebastian had made the changes to try to sabotage me. I had heard stories about Sebastian from my coworkers several times. Although they painted Sebastian as vindictive and unctuous, nothing pointed at him doing something so completely evil.

I rubbed my eyes, and sat back. I was the only one in the office, and the cleaning staff had already left for the day. The lights were all turned off except my cubicle light. I needed to take a break for a minute, so I got up to get a cup of coffee, and then logged onto a local news site.

The news site was covering Terry's murder. They loved to go into detail about how vicious the crime was. The reporters had tried to interview Terry's mother, but of course she hadn't wanted to talk about it. The girlfriend was in hiding. The story painted Terry as a loner, and mentioned how he had once been arrested for shoplifting. They had a video of an expert explaining exactly how painful it is to have salt poured into an open wound. I logged back off, swearing at the computer, and opened up the directory. If I was going to start over, I needed a fresh statement template, but I could never remember where the template was saved, so I opened up a search query and paused, wondering what word I should search on. “Statement” wouldn't work, because every client directory would have that file in it. I saw that you could search on size, and remembered that the file was pretty big.

I search on size, looking for files greater the 15 mb. The query spit back files like a machine gun, and I saw the file I wanted. I almost clicked on it, and then saw a file called “Relativity.xls”, which was much larger then any other file the query had found.

And, in front of my shocked eyes, the file was growing. Files on a computer do not grow continuously like a living thing. They grow discreetly, and stay the same size until someone saves them. In order for the file to be changing, I thought, someone would have to be saving continuously, which doesn't make any sense, because you could never get any work done if you were pounding the save button. I wondered who was working on the file, and remembered that if I double clicked the file, it would tell me who was in it. I would only be able to open the file “read-only” but that was okay, as I didn't want to actually work but just satiate my curiosity.

I clicked on the file, and to my surprise it opened. The file was a database, and I could see that there were several groups of information I could open. I mentally noted there was a query box in the upper quadrant, and clicked on one of the groups as the names did not follow a discernible pattern.

The file popped open, springing forth like tulips in a spring sun. I scanned the information, and quickly saw that it was filled with various information I would find in almost any actuarial file: Names, Dates of Birth, Addresses, and other personal information sprawled inside the spreadsheet like squares in my Mother's quilt. I started scrolling to the right in the spreadsheet, and was amazed at how many columns there were. There was

spousal information, financial information, and other information that had no place in an actuarial file. I stopped my scrolling and thought about why someone in the office would need such a file.

Then a cell filled itself in.

I stared at the file, trying to understand what I was seeing. As I stared, more cells began filling themselves in. All of the dates were today's date. I wondered how many people were in the file, so I started to scroll down the bottom of the list. Normally actuarial files have ever person who is currently or was historically employed at a particular business. Actuaries can use this information for numerous reasons, but Pension actuaries like the ones in my office used the information to help companies fund their pension plans. The largest file in the office had about ten thousand participants.

My jaw dropped when I scrolled passed the hundred thousand mark. The data showed no signs of stopping, indeed the progress bar on the right side of the screen showed no indication that the file was even close to ending. I grabbed the progress bar using my mouse and dragged it to the bottom. There were almost seven trillion entries. I sat back in my chair, putting my arms behind my head, and closed my eyes. What was this file? It didn't make any sense.

I opened the search function, and typed in my social security number. The cursor flipped up to my entry. All of my information was there: my date of birth, my date of hire, my current address, and all of my other information was in the file. I pushed back my chair and rubbed my eyes. I need a break, I thought, and I got up to grab a cup of coffee. I walked silently down the hall to the kitchen, and grabbed a mug. What was the file? Could this be some massive database for every person in the world?

Could I manipulate it?

I went back to my cube, almost wishing the file had gone away and was a figment of my over worked imagination. I remembered stories of travelers in a desert who see mirages of vibrant oasis and hoped desperately that my over active imagination, fueled by caffeine and my friend's brutal murder, had caused me to hallucinate. As I rounded the corner in my cubicle, the same corner that my friends at work hid behind to throw small projectiles at me from, I saw the glow of my computer screen and saw that the file was still there.

It was still GROWING.

This file is more alive then Terry, I thought, slumping a bit in my chair. A computer program had more life then the person who used to hold my greatest secrets, the friend who had almost singlehandedly helped me run for Class Treasurer. We had been in everything together: baseball, mathletics, even doing a play senior year. All of those memories, bouncing around in my head.

That is all Terry was now. A pile of memories, most good. Some, well, some...

Not so good.

I shouldn't think about that now, I thought. We were young, and we made mistakes. Suddenly I sat up, my fingers moving reflexively over the keyboard, pulling up my friend's query in a matter of keystrokes. Terry Keller. Born January 18, 1982. Died June 22, 2010. I moved my finger over the date of death, and my finger hovered over the delete button. What would happen, I thought, if I press delete? Could something is this computer file, which is completely virtual, affect something in the real world? Normally I wouldn't think it could, as the virtual world and the real world are completely distinct from each other, despite what everyone on Facebook seems to think. However, this computer file seems intrinsically linked to the real world, and is unlike any file I has ever seen before.

My finger pressed down. On the screen nothing happened. I realized I had been holding my breath, hoping for a second chance with my friend. So I can't change anything, I thought, and a smile broke out on my face as I processed the ramifications of what I had

discovered. If I could have changed things, the temptation would have been too strong. I could have selfishly given myself a billion dollar salary, or perhaps even gone back and erased the holocaust by killing Hitler before he had a chance to massacre millions.

So I cannot change the past, I reasoned, but what about the future?

I pulled open the search query, and typed in the name of one of the men who was charged with killing Terry. The cursor started blinking over the man's name. David Grammond, born November 11, 1979. No Date of death present. I thought about David, and wondered what he was like before the killing. Did he like watching TV shows? Did he pretend he didn't like pop music? Did he have a secret sketchbook full of dazzling artwork? I saw that David had a child born in 2002. She is seven years old, and has no idea what a monster her father is, I thought.

I cycled through the other two killer's names. On a whim, I held down control and selected all three entries. I moved the cursor over date of death and typed in tomorrow's date. The system allowed me to type it in, and I was surprised. I felt there should have been some sort of resistance. Perhaps a "are you sure?" should have popped up, like when you try to close a file without saving it. Here I was, forever changing peoples' lives, and no second chance was given.

I pressed enter.

III.

Time blurred.

If you have ever fallen asleep at a lecture, then you know exactly what I mean. You are trying so hard to concentrate, and your eyes begin to close on their own accord, despite your best efforts to the contrary. For the briefest moment of time, at least to you, your eyes shut and your head falls forward and you are gone. And then you pull your head up. That brief period of time is lost forever, yet at the same time feels like nothing changed.

That is exactly what happened with me. One second I was surrounded by pitch blackness outside, with the soft patter of the end of the rainstorm hitting the glass of the building, and the next, full morning sunlight streaming through the windows, and the muted conversation and soft sobbing of coworkers.

I looked at my computer, and saw the spreadsheet still running. I closed out and noted the time. It was almost ten thirty in the morning.

Shit, I thought, I didn't get those statements done. I looked down at my disheveled clothes. I did not remember untucking my shirt, and there were soft stains all over my dress shirt. I felt my beard, and the stubble scratched at my hand. My hands and arms were covered in long thin scratches. Okay, I thought, maybe I fell asleep at my cube. I need a coffee. I felt around my desk for my wallet, but couldn't find it.

A glass of water then. I got up, and walked right out of my cube, almost ramming into Tanya whose eyes were red with tears.

"Tanya," I said, looking at her. "What happened?"

"You didn't hear?" She looked at my clothes. "Did you work all night?"

I lied. It was easier then trying to tell the truth. "I had a project due for Sebastian. What happened?" my voice rose at the end, and she gave me a look and pulled me into her office.

"We have to clean you up. Honestly, I don't know how you could have work through it."

"Worked through WHAT?"

"Tom, a bomb went off. At the courthouse. It killed everyone inside. How did you not hear the explosion? Or see it through the windows? How could you not hear the sirens? I am surprised you came in today. Hell, I'm surprised anyone..."

I was staring out her window, which looks east out into the city. Where the courthouse used to stand, sooty black smoke rose into the air. I could see the clusters of emergency vehicles and news vans. I could see thick rain clouds moving quickly towards my building.

"Do we know how it happened?" I asked, starting to panic a bit.

"No one. Tom, can you believe a terrorist attack - in our own city?"

I had no reply except to stare out the window.

"What is all over your shirt?" She asked, more businesslike.

"I spilled on myself. I don't know. Look, I have to go. I'll talk to you later." I rushed from her office, heading for the bathroom. Some of my coworkers gave muted hellos when I walked past, but I ignored them all.

I walked to a stall, and sat down on the toilet, shutting the door behind me.

What the hell did I do?

Did pressing a button in a computer program do something in the real world? Is that possible? I closed my eyes, and tried to clear my mind. I can change things, I thought. True, I killed hundred of people, but I can make up for that. I can change other people lives, make them better, make them happy, give them money, make them live forever, I can do anything, I can do...

Can I? Should I? Should I go through and change peoples' lives? Or will I always make them worse? I remember reading an article about nature conservancy, where humans try to fix problems inside parks, but no matter what we try it creates a larger problem that no one could foresee. Is that what would happen here?

I looked down at my shirt, and thought, or did I make it all up? Did I sleep walk last night, or perhaps just blanked out my mind? Where is my wallet, and how did I get these cuts and these strange stains on my clothes? Did I imagine the spreadsheet to try to justify something that I did?

IV.

"I think I might take a few days off," I said calmly. I was in Tanya's office.

"Really, Tom? We are in the middle of our busy season. You think this is the best time to take off?" I could see the conflicting emotions in her face; she was at once concerned for me and for the job.

"I didn't really want to tell anyone this, Tanya, but Terry Keller, the guy who was murdered, he was my good friend. I thought I could handle what happened to him, but I just can't. I need to take some time, and process what happened." I couldn't look at her anymore. I stared at the pictures of her fiancée on the desk. He was rugged and confident - in short, everything I wasn't.

"Oh my God, Tom. I didn't know. You could have..."

"I know. I didn't want to burden anyone with my issues. I just thought....well, I just need some time off."

"I understand. We can shuffle your work around. Take as long as you need. I mean that. I...we like you around here, Tom."

I didn't know what to say. I wanted to say that they didn't know me. That was probably true. I didn't even know myself at this point.

"Thank you," I said, turning to leave.

"Tom," she said, and I turned back, expecting something amazing. Something inspiring, like it wasn't my fault hundreds of people died today.

She continued, "I know this isn't important right now, but your laptop came in. Your computer is going to be put in the server room unless anyone needs it."

"Okay."

I walked back to my cube in a haze. There weren't many people left in the office. Syracuse is a small city, and almost everyone had been affected by what had happened at the courthouse. I sat down in my cube and wondered if I would ever see it again. At least I knew that the computer would be rotting in the server room, unused. They would probably throw it out and it would sit in a landfill somewhere, no one realizing its true power. It might get stripped down for parts.

My thoughts drifted to a darker place. What would happen if the power gets disconnected from the computer? Would we all die? Would the world last just long enough for the battery on the motherboard to die out and we would all twinkle into nothing?

I heard swearing from Sebastian's office. I briefly cringed in horror, expecting him to come out and yell at me for not having the statements done. Then I realized that I didn't care.

It didn't matter.

He came out of his office and went directly into Tanya's office.

"My computer froze again," he yelled.

"Sebastian, I'm sorry..."

"Sorry doesn't cut it. When we had the old towers this never happened. I have stuff that has to go out today, Tanya, TO-DAY. I can't have this happen."

"Its okay, Sebastian, Tom's laptop came in, and he is going on a medical leave. You can have his computer until your laptop gets fixed."

"That's fine. I am going to take my lunch. Have someone set it up before I get back. A medical leave huh? Unbelievable." He stormed out of the office.

I took a sharp breath. Then I sat back, closed my eyes, and thought for a second.

Reason is tricky. Fickle even. Sometimes we take in all the same assumptions and givens for a problem, and two perfectly logical beings can draw vastly different conclusions. It's all in the light, you see. Where some perceive hue and contrast, other see shadows and angles. In the end though, does it matter if one is right or wrong? Sometimes you can do the right thing, or the wrong thing even, while attempting to do the opposite. I guess what matters then is your motivation...and not necessarily the outcome. In my heart I know I wanted those three people to die. I wanted them to die, but not the others, and so my motivation was arguable fine, but the outcome was not. Those three – David, Chuck, and Jim- their motives were not so pure, and their outcome was exactly the same as mine. So, is motivation important? Or outcome? Or both?

Or neither?

I listened to the rain beat against the windows in a steady unrelenting pattern. I take one more breath, one precious and life giving breath, and I think about all the people I have touched in my life, some good and some not so good. I wonder where I fit on the cosmic scale of justice.

And then I spring into action, grabbing the computer, ripping it from the wall, screaming at the top of my lungs. I run out of my cubicle, and as I pass Tanya's office I see her starting to stand, her eyes wide with fear. I see other cowering in their cubicles, wondering what was happening. I get up to stride, sprinting down the length of the hallway towards the sheets of rain pounding the window. Perhaps if the window wasn't so old and hadn't had to deal with the constantly fluctuating upstate New York weather it might have held when I smashed my body into it, but it didn't. It blew outward like water from a

punctured balloon and I was the needle, falling into space from the eighteenth floor, cradling my computer tower like a child. For once motivation didn't matter, for my outcome was my own. I had complete control over my life for the first time.

Headline from the Post Standard July 4, 2010 –

TERROR IN THE SALT CITY

and below the crease-

KILLER COMMITS SUICIDE – MOTIVATION FOR BOMBING UNKNOWN

NRS

1-5-2010 - 6-17-2010

A Matter of Degrees by “Rodge”

Ch. 0 - The End

The dozen members met for the final time on April 15. Actually, it was a baker’s dozen, but Al never spoke at the meetings, and was not thought of as part of the group. He discussed with each individual his role between meetings and was recognized as providing support for the group and getting the members in contact with each other originally. Since that first meeting four years ago, progress towards their goal had been steady if not exceptional.

These were not the movers and shakers of the financial world. In fact most would not even show up in the appendix of Who’s Who of Modern Finance. They were here because they believed in a common future for the country and had roles, although minor, which were influential in ways that Al had recognized at the start of this project. Just like a massive oil tanker cannot turn rapidly to avoid the reef, Al understood that the course of the country was impossible to be redirected quickly. The people with the influence necessary to make a major change had all the incentives to continue the status quo.

This group was formed because Al believed that a series of small seemingly insignificant actions could change the course of the country just a few minutes of a degree. Over enough time, these slight changes in direction will result in arriving at a very different place. As long as each action was minor enough, the changes would not be recognized until the country was committed to its revised direction. At that point, the same momentum which kept the country from changing quickly will work against the established powers, and they will be powerless to stop the revolution.

The members were selected from across the most influential banks, hedge funds, private equity companies, government regulators, the rating agency, and an auditor. Al recognized that finance had come to dominate the economy and by the transitive property, the country’s direction. To change the direction of the country, he needed to change the direction of finance. These were the people who were placed in roles where they could make that one degree impact without being noticed.

On the infrequent occasions that the group did meet, John had taken over as leader. Whereas the other members had minor roles in their organizations, John was the chief actuary of Harding Insurance Company. He had the most to lose from this undertaking, and thus felt compelled to manage the process as much as possible. Even in this process, he was thinking of risk management.

“Risk management?” John thought bemusedly, “If everything goes according to plan, I’ll be fired from my job. What’s the risk to manage - that I’ll stay gainfully employed, make a lot of money, and everything will continue on its current track? Yes, that is the risk.” Shutting up the voices in his head, he turned to Sally.

“Sally, how do the portfolios look?”

Sally was an asset analyst in the alternative assets division at PJ Smith Barney. She was in charge of valuing cat bonds and offering purchase recommendations. These assets were often sold by the major P&C insurers to unload some of their exposure to major undiversifiable risks. PJSB was a major player in packaging and placing these assets. The sell side division of PJSB was responsible for that aspect of the business, and there was a firewall between the sell side and the buy side where Sally worked. After years of competition though, the firewall had developed a few windows for intra-company cooperation.

“This pricing year has been very aggressive,” Sally stated, “and we had to buy a large portion of the bonds in order to keep the issues fully subscribed. The bonds have been spread over our client company portfolios. The change in capital rules allowed us to put a significant portion in our life insurer portfolios. They love the yields and lack of correlations with other assets. We’ve unloaded most of the equity tranches to the Paulyanna Hedge fund as planned. PJSB has kept the first sub tranche on each deal - about 100 billion in total. I think the managers were getting nervous about placing everything this year, next year they may require us to be more conservative.”

“Thanks, and good work. Hopefully, it won’t come to next year.” John then turned to Steve and Jane, “Any progress on the Hybrid capital front? “

Jane, a policy analyst for the Federal Uniform Governance Group, spoke up first. “FUGG has gone through the comments from industry issuers and insurers. We’ve made a few minor tweaks to the proposed regulation allowing Hybrid capital notes to be included as level three debt instruments for statutory purposes. From the comments, it appears that the major life companies are going to take on the maximum allowed. The duration and yield are unbeatable for the longer liabilities. The NAIC will go along with FUGG’s recommendations in order to maintain their modest relevancy”

“Yes, I think I have the Risk committee at HIC convinced that these are the only assets long enough to match our GMIB payouts. Steve, what is the rating agency saying about these.”

“Standard AM Poor Best is...” Steve was interrupted by the impolite chuckles.

“Who the hell came up with that name? “

“It was the last the holdup to the merger, and it became a standoff, finally, ‘cooler’ heads stepped in and reminded everybody that when you’re a monopoly it’s all good.”

“Well, it is not ALL good, but please continue.”

“Anyway, SAMP, is modeling these as pure debt for capital purposes. It seems that the larger insurers will be allowed up to 5% of assets in total and 1% max in one issuer. I’ve managed to get the models to show the 95% CTE to be manageable at those levels.”

“Excellent, you’ve really thrown the industry a lifeline. The interest rates on debt have been so low for so long that we’re desperate. The other chief actuaries I’ve talked to have uniformly said that they’ll add the max to their portfolios once approved. The boards have been getting on them to release the additional actuarial reserves required from solvency testing. The yields on these assets should be good for a few percentage reduction of reserves. Beth, is the SEC on board?”

“Yes, I think they will grudgingly call the Hybrid notes tier 1 capital for the banks.”

“That’s good news. That was the last impediment I was worried about. Good job on your report recommending them.”

“Well, I don’t think my report had much to do with the decision. The billions in lobbyist dollars made only one decision possible for the management who wanted to continue their employment. My report just gave them cover to make the decision they were paid to make.”

“I’m glad HIC’s PAC money is effective. Well, Brian, you’ve had a good run the past few years, are you ready to have a turn of luck?”

Brian was the youngest and most infrequent member at the meetings. The 80 hour weeks as a fundamental quantitative analyst at Paulyanna made him mostly invisible to the outside world. His correct call on longevity bonds though had made him a cult hero in the hedge fund industry. The “Billion Dollar Bonus” man’s trades were no longer questioned in the company or industry. He was viewed as a Seer by his peers, but, of course, it was easy to be clairvoyant when one had contacts in the life industry pulling strings for you.

“Yes, I’ll be glad to be out of the industry soon. Seeing the sun will be a bigger bonus than any money I could make at this point.”

“Sorry that you have to be the first domino to fall.”

“No problem, I just feel bad for my colleagues. They’re good people who are just trying to do the best they can. But at least they’ll have a soft landing right?”

Jeff, acquisition analyst at PJSB, took a deep breath “I sure as hell hope so. I’ve been raving about Paulyanna’s other divisions for the past year. I’ve had to throw you under the bus Brian, saying you take too much risk and are not accountable. I think PJSB will be ready to pounce on Paulyanna-ex Brian.”

“Tough year, first my wife and now its going to be Paulyana. How many divorces can I have in a year? Well, at least Paulyanna will be the one screwed out of their assets in this round.”

John sensed that the magnitude of their plan was sinking in and the surreal feeling leading up to this point had been replaced by a most real understanding. He moved to close the meeting before the collective mood went too dark. “Thanks everybody.” He looked around the table, every eye held his when they came in contact.

“You have all done your jobs appropriately, remember that. Not one of you has done anything outside your work. Brian, you made Paulyanna billions on a risky trade, another trade just may go wrong, it happens in your business. Jane, you didn’t change the risk profile of insurance companies, you just helped tweak the rules to allow insurance companies to achieve higher profits without additional capital. Each one of you, is just fulfilling your role in this economy. You are not responsible for what is coming. You have just changed the course a m of a few degrees.”

Everybody in the room understood what those few degrees would mean over the next few years.

“When the first depression of September develops, the risk off trade will commence.”

A few people nodded, but most just sighed, stood up, and left without a word. John was left sitting in his chair with his eyes closed. He was startled out of his thoughts by Al’s voice.

“Will you be able to direct HIC appropriately?”

“I believe so, we’re putting together our five year plan now. It’s going to be practically impossible to meet our stretch goals without taking the steps I’ve outlined. I think that’s the case across the industry.”

John closed his eyes again, people are going to look back at HIC’s pro-forma and say it was the worst projection in the history of actuarial prognostication.

Ch. .999....

Wall St Journal
Section C - pg 10
9/19/2016

PJSB acquires Paulyanna

In a deal that came together quickly, PJSB agreed in principle to acquire the assets and liabilities of Paulyanna Inc. the formerly high flying hedge fund. Paulyanna found itself in trouble last week after super star trader Brian Goodman had a massive Molybdenum futures trade go awry. When the markets moved against Brian and Paulyanna, the margin calls forced the fund to freeze all liability payments. The fear of a high profile hedge fund insolvency sent a shudder though the markets last week with the DJIA dropping 10% before stabilizing at down 5%.

The value of the acquisition has not been disclosed. Last quarter, Paulyanna released a press statement saying they had become the first 10 trillion dollar hedge fund. Conservative estimates are that the fund has liabilities of 9 trillion spread around the international banking system.

In a statement, PJSB CEO John Coalson stated “We have been interested in Paulyanna for some time. They are top notch asset managers who unfortunately were led astray by an out of control trader who was trying to duplicate the success and notoriety of his longevity bond trade. PJSB will not continue to employ Mr. GoodMan’s services. Our compensation model is specifically designed to prevent this type of one sided risk taking by our traders. “

“We have committed to making whole all of Paulyanna’s liabilities. Further, PJSB is funding this purchase with the new Redeemable Convertible Asset Product securities. This means that the existing equity holders will not see a dilution of their stake in PJSB. These securities will bring our Tier 1 tangible capital levels to 10%. That is one of the top levels in the industry. This transaction will be immediately accretive to earnings.”

Fed chairman, Dan Dumbledorf stated that the banking regulatory group will put this transaction on the fast track for approval. On a side bar to his semi-annual congressional address he commented that the financial industry was never at risk during Paulyanna’s troubles, and in fact PJSB completing this transaction will make the banking system even more diverse and safe.

After hours trading had PJSB stock up 15% on news of the transaction. That will make Mr. Coalson very happy. This past year PJSB’s compensation committee changed the CEO’s bonus structure to be keyed off increases in share price. Based on yesterday evening’s trading prices, this deal earned the CEO another two billion dollars in bonus cash.

Ch. 1

USAToday
Front Page Headline
9/28/2016

Hurricanes Destroy Oil Fields and Surrounding Cities

Hurricanes Quinn and Rick have finally lost strength after doing unprecedented damage to Texas, Louisiana, Florida, and the Gulf oil Fields in-between. The measures put in place along the gulf coast to protect residents and infrastructure after Katrina hit last decade stood no chance against the one-two punch of Quinn and Rick. Army Corps of Engineer Captain Knapp, “We designed the structures to withstand a once in a century storm, we got two thousand year storms in a week.”

The storms, which started as minor depressions off Africa September 14th, seemed intent on doing as much damage as possible. Quinn crossed south Florida on Monday, causing an estimated 50 billion in damages to Miami and surrounding areas. The damage Quinn did in the Gulf of Mexico is still being assessed. All oil flow has stopped in the area as engineers have not been able to get to the derricks due to the damage on the shores. Rick took a southern route dancing with the coast of Belize, Honduras, and Mexico, before hitting Galveston and moving through the Gulf. Rick exited the Gulf through northern Florida on Friday.

Unusual weather patterns caused Quinn to follow the Atlantic shore up through New York. Those same winds caused Rick to turn northwest and head towards the heartland. The Weather Channel’s Astin Martin reports that the jet stream which would normally push the hurricanes into the Atlantic was in Canada at the time. With no countervailing forces, Rick roared through Tennessee, Kentucky, Indiana, and finally was downgraded into a depression around the Windy City. Midwestern farmers finally got the rain they were praying for, but it was too much too late. John of Valparaiso, IN lamented “I was just starting to harvest what little corn was in the fields when the storm came and turned the fields into swamps.”

Areas across the country are feeling the carry on effects even if they didn’t get hit by the wind. Oil prices topped out at 505.34 in Friday’s trading. Corn and Soybeans also hit record highs. Gasoline, where available, was priced over 20/gallon. President Blockman’s spokesman has announced that the Strategic Petroleum Reserve will be tapped as soon as possible. There remains significant question when that impact

will be seen at the pump as the infrastructure to refine the oil has been seriously damaged.

Go to the following pages for more information:

Government reaction - B2

Markets are uneasy - C3

Insurance Capacity - C4

Human Toll - F10.

Ch 2

National Underwriter

Year in Review

12/12/2016

It was a stormy year for the US and the insurance industry. Although the worst of the weather ended in September, the waves have been felt throughout the fourth quarter. AllFarm, the United State's largest P&C insurer, announced the Friday after Thanksgiving that it had agreed with Federal Uniform Governance Group (FUGG) to enter receivership.

Mary Moore, Chief Administrator of FUGG, confirmed, "FUGG has taken over AllFarm, and will manage the claims process for the disaster experienced this past year. The sheer magnitude of damage done has made quantifying the exposure of AllFarm nearly impossible. I know that for those impacted by these devastating storms all you want is your promised payments to get your life in order, but we are still trying to value the assets in AllFarm. The precipitous drop in both equity and bond markets has made it difficult to determine how much money is currently available in the company. I can assure all policyholders though, the Federal Government of the US will step in to create the money necessary to pay all valid claims."

Ms. Moore later clarified that the government has the money necessary to pay claims and is backed by the full faith of the US treasury.

As is often the case, this failure did not happen in isolation. The Federal Reserve, recognizing the importance of the insurance industry in the economy, immediately lowered the overnight rate to 0% and announced QEX in early October. This strong action seemed to calm the markets and the SAMP 500 gained back half of the drop since the hurricanes had hit.

Unfortunately, what is good for one division of the insurance industry is not good for another. One appointed actuary who wished to remain anonymous said "How the hell can I pass Solvency V when 30 years are at 2% and I have 100billion of LTC?"

John Harmen, Chief Actuary at Harding Insurance Co and chairman of the Reserve Modernization subgroup of the AAA, reported, "The storm and associated fallout has been a human and financial disaster. The toll has been high, but I am confident the life insurance companies will manage through this crisis as they have done the crises before. I specifically want to praise the work at FUGG and SAMP to approve and endorse respectively the new assets available for investments. The Hybrid Capital notes for example, have yields and durations which are exceptional for long liabilities and will be a godsend for Solvency testing this year."

Ch 3.

Personal Finance Newsletter

January 2017 Issue

The Santa Clause Massacre

When Wells of America announced at 4:01 pm EST Christmas Eve that they were delaying payments on all their bonds, Asset Managers everywhere knew that they were going to wake up with coal in their stockings

the next day. Given the current prices of commodities, that would have been better than what they got. After the long weekend, it was clear that the Federal Reserve and US Treasury were out of bullets. The equity markets opened down 10%, and triggered the circuit breakers at 10%, 20%, and shut for the day. Tuesday was not shaping up to be any better when Wall Street was shut down for a “National Day of Collecting Your Senses.”

Despite the assurances of Chairman Dumbledorf, nobody who owned a paper asset was sure of its worth. Wednesday, the markets opened, but the volume was unusually low. In retrospect, the Bid-Ask spread was just too wide to have an effective market. There was no liquidity, period. Oh, there were dollars. There were dollars falling from the sky. The Fed made sure of that. But what were those dollars worth? That was the question to which the answer was unknown.

The price of gold skyrocketed. It briefly passed the value of the DJIA. Yes, you could buy the DJIA with an ounce of gold. Then inexplicably, Gold plummeted. In the space of a trading day, Gold lost its place as a store of value. The population, and at a slower pace, but eventually the traders realized, that a person could not eat gold, a machine could not be powered by gold, and when the counterparties wanted food or power, gold became a pretty metal, nothing more.

On Thursday, in addition to AllFarm, The Gecko, Progression, and Florida announced that the Cat bonds sold during the prior year would be worthless. Phone service to the Bermudan reinsurers appeared to be unavailable, as none of them could be contacted.

The year ended, mercifully, at the close of trading Thursday. The historical records will show that after being up 10% at 8/31, the SAMP 500 dropped 60% over the ensuing months to close the year down 56%. The safe haven treasury bonds are something of an enigma at this point. The official government statistics will show that the 10 year ended the year yielding 2.1%. The unofficial Zippo Hedge website shows that the only party buying treasuries was the fed, and that was only the direct issues of the government. The market for corporate bonds has been effectively shut.

As a macabre encore to the carnage experienced during the previous week, after the close of trade on Thursday, PJ Smith Barney, the largest investment bank broker dealer trader, announced that they were forced to invoke Chapter 11 bankruptcy protection. As PJSB CEO Coalson said, “The unprecedented stresses in the markets forces us to take this step. The assets we took from Paulyanna were riskier than we could foresee. The risks they took were unconscionable and did not fit in our business model. Nobody regrets this filing more than I.” The value of the 100 trillion in liabilities remains mired in bankruptcy court. It is unclear how this development will affect Coalson’s stock based bonus. The stock closed at 44.54 on the last trading day of the year, and opened at 0.44 on the first trading day of the new year.

The consensus is that during a crisis, correlation goes to one. During this crisis, correlation went to one, and then kept going to undefined. Value was undefined, market price was undefined, and certainly wealth became an unknowable concept.

In the year end report, Personal Finance generally lays out a plan for achieving increased personal wealth and happiness in the following year. This year, the editors at PF can only recommend investments in hard assets. We standby the value of Colt and Remington, Campbells cans, General Mills boxes, and solid bars of Hershey.

Ch 4

FUGG’s Annual Report to Congress

This report documents the state of the insurers under FUGG’s jurisdiction as required by Congressional action 1234.56667.

The insurers covered by FUGG are insolvent. FUGG has ordered a six month moratorium for all insurance payments as allowed in all contracts. FUGG believes this unfortunate step is necessary to maintain the

credibility of the insurers. The following describes the steps which brought the industry to this predicament.

1. Upon market open 1/3/2017, all issuers of RCAP notes exercised the convertibility option and converted the debt instruments to equity.
2. Major insurers depended on the high yield of these notes to pass Solvency V. As equity, these zero yield, zero liquidity notes were worthless.
3. The major insurers' balance sheets included 5% of RCAP. The decline in value of the RCAP eliminated all capital cushion.
4. With official treasury yields near zero, corporate securities at an undefined value and yield, and an unknown investable universe, Solvency V became an exercise in imagination.
5. Harding Insurance Company became the first to announce receivership on 1/31/2017. Other variable annuity writers soon followed. The guarantees on the VA's became unsupportable. That all of the guarantees dropped into the money simultaneously was unforeseeable. It was a 1 in 100 year event, and general account reserves were sufficient only to the 5 in 100 year level.
6. The outstanding debt liabilities of these insurers totaled nearly 50 trillion. The value of these liabilities became unknowable. The banking industry held a substantial portion of these liabilities, as the insurers, large and small, held a substantial portion of the trillions in bank liabilities.
7. It was determined that the value of paper assets in this economy is unknowable, and may in fact be negligible.
8. We can quantify the dollar value of exposure, but we can't quantify the value of the dollar.

In conclusion, although the U.S. Government can guarantee the payment of the claim dollars. FUGG cannot guarantee the fulfillment of the spirit of the insurance guarantees. As such, we recommend that the claim moratorium be maintained for the following year.

Ch. 5

Bundesbank Year in Review
Excerpted from Report to ECB
As translated by Gunther Mangelshumacher

The year 2017 will go down as a most difficult time in history. Although Europe's austerity measures have been implemented successfully, a disturbance from the USA has reverberated across the Atlantic. At this time the Bundesbank has concluded that the US dollar may not be the optimal currency for world trade. We believe the value of the dollar is not marginally higher than the paper it is printed on. We believe that all assets denominated in US dollars should be given a value of zero for purposes of ECB stress test. Although moderately aggressive, we believe this valuation is reasonable given the current situation. The following documentation covers the basis for our recommendation, and describes next steps for the Union.

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Ch. 6

The Egyptian Times
2/29/2018
As translated by Eimal Amanni

Shock and Awemost

The United States' campaign to obtain access to the oil fields of the Mideast ended when they ran out of energy. The full might of the US military was indeed awesome at first stroke. The destruction wrought from the sky was only superseded by the juggernaut of the ground forces.

In time, like a cannibal feasting on itself, the forces realized that they were destroying their own strength. The burning oil wells were a tribute to what the US wanted, but could not obtain. The explosions on the

ground continued even after the explosions in the pistons had stopped. The faithful will long remember the scenes of American GI's with their thumbs out hitchhiking back to base after the war machines had run out of petrol.

In an act which can only be categorized as a presidential temper tantrum, President Blockman unleashed a ballistic nuclear attack on Tehran. Like the sand which was crystallized into glass, the hearts of the survivors were crystallized in hatred.

Ch 7

Topeka, KS Topics
7/4/2019 Independence Day Edition

Will Work for Food

Itinerant Americans are traveling across the Midwest offering to work the farm fields in exchange for a portion of the crops and shelter. Local farm owners say that the unexpected help has improved prospects for the fall harvest. Although in the current environment, any business enterprise is tenuous at best, the symbiotic relationship between the hands and the planters has worked well.

John Smith, owner of the plot at 615 Darwin, says "The help is most welcome. Diesel fuel has become too expensive and unreliable available. The workers who have come by just want a safe place to stay, food, and an opportunity to earn the next meal. I have food from the last harvest, plenty of room, and a need for people to help maintain the land for the next harvest. I imagine these are the challenges the original settlers encountered several centuries ago."

Jeff Long, a former trader at the CBOE in Chicago, commented "There is nothing left for me in the city. I needed to get out to feed my family. Mr. Smith has given us an opportunity to earn our keep. At this point in time, I can't ask for anything more."

Ch. 8

Word of mouth - Ivan and Drago
8/30/2019

Ivan - Good to see you friend, how have you been?
Drago - I have been. And you?

-Also, I have managed. Where have you been?

-During winter I was in the South East for the citrus harvest. It was very nice, and so I stayed through the summer. Come August the heat got oppressive, without AC and consistent electricity it was untenable so I moved north. I worked July and August on the hog farms of Illinois. I'm now heading west to the coast, I hear the fisheries are looking for help. What are your plans?

-I'm working the ranches in the Dakotas for the foreseeable future. I never thought animal husbandry would have such a role in my life.

-I understand. We do live in interesting times.

-True, good luck my friend.

-To you as well.

Ch. 9

Smithsonian Archives
Inauguration Address 1/20/2020

Chief Justice Roberts, "Ladies and Gentlemen, I give you President Gore."

Thank you. I am both honored and humbled to stand before you today. At this time we face the greatest challenges in modern history. The ways of the past are irretrievably lost. The accounting model which produced endless profits and attractive Return on Equity is not part of our future. Producing real returns will need to be replaced by the production of real goods.

The country is at a crossroads. We have the opportunity to accept that mistakes have been made and move forward, or we can wallow in the morass of the past. The world has changed. Paper is no longer an asset. What we do possess is an insatiable drive to survive, natural resources (even in this modern environment) which will provide for the basics, and ingenuity to make the most of the hand we are dealt.

...

Ch. 10

Rocky Mountain Observer

Buffalo Drive

9/28/2026

Robin is perhaps the poster child for the new economy. The former chief actuary for a life insurance company, Robin now is in charge of driving buffalo from South Dakota to the Denver meat market. He chooses to ride a horse even though gas has become more widely available. The meat that he brings to Denver is not the Heifers of the past, but semi-wild animals who have adapted over hundreds of years to the environment. The residents of the region are rushing to catch back to the buffalo. Can we adapt to the world we now live in? Robin seems to think so...

"I like the Buffalo drive. There is something elemental about it. I know that this traveling buffet will feed thousands down here, and we'll head back to the Hills with grains to make bread for the winter. Herding the buffalo has proven simpler than herding actuarial students at year-end."

Robin puts the ear buds from his iPod back as he rides off into the sunrise.

Community Notes - The Market is looking for workers Monday through Wednesday, wages are anticipated to be 2 lbs of buffalo meat per hour. Wheat is a needed commodity for this trading cycle. Meat sellers are tentatively willing to trade 1 to 1 for meat to processed wheat. As always, fresh fruit and vegetables are hot commodities and will draw many attractive bids.

The Beginning.

The Society of Actuaries 9th Speculative Fiction Contest
Entry by A. Haeworth Robertson

Two Improbable Suggestions

My office smelled like gardenias, my favorite fragrance. The flowers had been sent by the president of the insurance company where I'd worked the past five years. In one hour I was scheduled to have lunch with that same president, as well as the company's medical director. I was going to be awarded a check for \$25,000, first prize for the Best Business Suggestion of 2010. Also, my promotion to vice-president-product development was going to be announced, and I was going to be given a month's all-expense-paid vacation for two at Hotel Bora Bora in French Polynesia. What more could I want? Well, I have something in mind, but I'll save that for later.

It all started last year when I put my entry in the Red Suggestion Box outside the president's office. I had just read a novella entitled *The Silver Pendant*, about a young actuary who had risked his life solving a murder mystery involving some of his insurance company's policyholders. It resulted in his company's dissolution, so his rewards were not as generous as mine.

The story involved viatical settlements, later called life settlements, about which I'd never heard before. Perhaps the best way to describe these settlements is to recount an example from *The Silver Pendant*.

When Scott Martin was aged 22, he had bought a \$200,000 whole-life insurance policy and designated his younger sister as beneficiary. The premiums for this insurance policy were \$155 per month, payable until his death, at which time \$200,000 would be paid to his beneficiary. The insurance policy had a "double indemnity" provision, so that \$400,000 would be paid if his death were accidental.

At age 27, Scott was diagnosed with AIDS and given two years to live. For medical bills and living expenses, he needed money now—not after he died—and his main asset was his life insurance policy. Since he couldn't work any longer, he couldn't afford to keep paying premiums; therefore, he could either cancel the policy and get a cash surrender value of \$4,017 from the insurance company, or sell his policy to a "settlement company" for \$130,000. The settlement company would pay the future premiums and receive the \$200,000 (or \$400,000) death benefit when it was paid. Since the settlement company expected the policyholder to die within about two years, it anticipated a handsome return on its investment. Scott received, in effect, an advance on his death benefit.

Before he sold his insurance policy, Scott Martin asked why the settlement company would pay him \$130,000, while his insurance company would pay him only \$4,017 as a cash surrender value. The settlement company agent explained that the cash surrender value offered by a life insurance company depended on factors determined at the time a policy was issued and did not take into account any subsequent changes in the insured's health. In contrast, the settlement company's offer depended on a current evaluation of the insured's health and the resulting life expectancy estimate.

As I reflected on this brief explanation, an idea occurred to me that would eventually result in my award for making the Best Business Suggestion of 2010: *adding the principle of individuation to aggregation in the management of a life insurance policy.*

I'll try to explain what I mean. Oh, I forgot to tell you my name is Alex Morgan. I'm an actuary—someone who studies mortality, calculates insurance premiums and reserves and cash values, designs insurance products, and who is thus sort of an engineer/architect of a life insurance company. But back to the explanation, which requires some background information and a few esoteric terms peculiar to the insurance business.

When a person applies to an insurance company for a life insurance policy, the application goes first to the company's underwriting department. Here, it is determined if the applicant is insurable and a premium rate is assigned according to the risk category of each individual. The risk category is based on the applicant's age, sex, medical history, occupation, lifestyle (skydiving is not good, for example), and a host of other factors. This assessment of the individual's risk of death, called "underwriting," is critical to the development of my winning suggestion.

After the insurance policy is issued, the policyholder pays the specified premiums and, upon his death, the face amount of the policy is paid to the beneficiary. In order to meet its obligations, the insurance company depends upon the receipt of premium payments from a large group of policyholders. In the case of a whole-life insurance policy (like Scott Martin bought), not all of the premiums are needed to pay death benefits in the early years. Thus, a portion of each premium is saved for use in later years when the probability of death is higher and the premiums will be insufficient to pay death benefits. These amounts that are saved, called reserves, are invested and increase from zero when the policy is issued to the face amount of the policy when it is assumed the last policyholder will have died (arbitrarily set at about age 100). These reserves also enable the company to pay a cash surrender value to a policyholder who elects to discontinue his insurance. And these reserves, plus future premiums, enable the company to pay death claims to a policyholder who continues his insurance.

Now, here's the interesting part—at least to me. Consider a group of policyholders of the same age and risk category, whose insurance policies are issued at the same time. When the insurance policies are issued, the reserves and cash surrender values are determined for all future years. At any future point in time—say five years hence—the total reserves plus the total expected future premiums for the entire group of policyholders will be adequate to pay the death benefits as promised. However, at that same point in time, some of the

policyholders will be closer to death than the others; hence some policyholders will require a larger reserve than the others in order for the company to pay the promised death benefit. This can be determined by a fresh underwriting; i.e., by assessing the changes that have occurred the past five years in the risk factors for each individual. (For example, John had a heart attack but Jim is still running marathons.) But insurance companies do not perform this fresh underwriting; they rely on the initial underwriting and on averages for purposes of determining reserves and related cash surrender values.

But maybe insurance companies should underwrite each policyholder once a year and assign him/her to a new risk category; and allocate a portion of the total reserve (and the associated cash surrender value) based on that new risk category. Thus, after the first year, cash surrender values would be different for each individual—dynamic rather than static.

In essence, this reassessment of a policyholder's health and probable remaining life expectancy is what a settlement company does before it purchases a life insurance policy from a policyholder. Presumably, however, the insurance company that originated the insurance policy is better equipped to do this follow-up underwriting, and can do it less expensively and with fewer conflicts of interest. Also, this could reduce the instances of fraud and abuse associated with life settlements that are being reported in the press with increasing frequency.

Of course, there are important drawbacks to performing such continual underwriting, and generating variable reserves and cash values: getting the necessary approvals from the state insurance departments; explaining this new product to sales agents and consumers; etc. But the overriding drawback is that this continual underwriting would be prohibitively expensive. So, reluctantly, I set my bright idea aside.

About the time I shelved this idea of continual underwriting, I was transferred to the underwriting department, which evaluates applicants for insurance and assigns them to risk categories. This transfer was a normal part of our company's training program, whereby employees are rotated through several departments during their early years on the job.

I was eager to learn my new job so I sought out the company's medical director and tried to have lunch with him at least monthly. This had two advantages. He was an important part of the underwriting department and a very knowledgeable resource. He had a Type-A personality and strove to stay abreast of new medical developments. And he had an intelligent, attractive assistant who didn't appear to be attached to anyone. That could be good or bad—maybe her job was everything to her. Alison Bryant was her name.

I learned a lot from the medical director, Dr. Whitney. One evening after work and after a couple of rounds of drinks, he started telling me about a futuristic diagnostic procedure. "Someday," he said, "we'll be able to implant a small electronic device in one's chest that will monitor all sorts of body functions and transmit the results to a receiver that is programmed to interpret them. With that sort of monitoring capability, together with a person's DNA and medical history, we'll be able to spot incipient medical problems early on and take steps to correct them. This will result in longer, healthier lives." And, I thought to myself, we can estimate a person's remaining life expectancy with much greater precision than at present.

It was hard for me to imagine how this monitoring could work, until he explained, "You know, the human body is a precisely designed container of chemical reactions. The body consists of trillions of atoms in specific arrangements and thousands of chemical reactions proceeding in a very orderly manner. That literally describes us, and yet it is clearly not the whole story. We do, however, know a surprising amount about how the body works and with such constant monitoring we can learn much more."

This sounded plausible when I considered a simple thing like taking an aspirin for a headache. We don't seem to know exactly how aspirin works, but it must cause a chemical reaction of some sort. I had never thought of it in that way, but now it seems obvious.

Dr. Whitney was so confident in his prediction that I couldn't help but think he knew more about this than he was telling me. Another time and another round of drinks and I might find out more.

In the meantime, spending time with Dr. Whitney enabled me to have frequent contact with his assistant, Alison. On the surface Alison seemed like an ideal woman—intelligent, physically attractive, enthusiastically pursuing a worthwhile profession. I had mixed feelings about getting better acquainted with her. On the one hand it might reveal some flaws and destroy my illusions about her. I find it comforting to think there's an ideal woman somewhere out there.

On the other hand, Alison might not have any flaws and I would then consider her unapproachable. But my experience had been that there were always flaws, so I did my best to get better acquainted—without appearing too eager or intrusive. We shared numerous coffee breaks and even had lunch together a few times. We never had a real date, but this had the potential for a long-term relationship and was not something to be rushed.

One afternoon Dr. Whitney asked me stay awhile after work to discuss a problem. He always seemed to be in control of everything so I couldn't imagine what the problem was. It must be me. I was sure my work was satisfactory. Maybe he thought I was getting too close to his assistant and there was a personal involvement I hadn't detected.

Dr. Whitney explained—somewhat reluctantly, at first—that he had a few private patients in whom he had implanted a monitoring device of the type he had hypothesized in our earlier conversation. This was

working out quite well and the devices were transmitting abundant data indicating incipient physical problems. The trouble was that there was an overwhelming amount of data—more than Dr. Whitney could assimilate and interpret. He needed help from someone experienced in working with such a volume of data, and had concluded an eager young actuary might be that person. In particular, me.

I jumped at the chance. This was going to be a whole new field of analysis. Of course, I'd have to learn a lot about anatomy and physiology—knowledge of probability and statistics wouldn't be enough. Analysis of all this data would enable mortality studies—as well as the underwriting process—to reach an unprecedented level of sophistication. And I would be in on the ground floor of its development.

Within a few weeks of working on this project with Dr. Whitney, I got the idea that resulted in the Best Business Suggestion of 2010. When I was in high school, my father gave me a book about creativity, about inventions and discoveries. It seems that most inventions follow a limited number of patterns. Take an item designed for one purpose and use it for another purpose. Take an item used for multiple purposes and separate the functions. Take two items and combine them. This last principle was the one I used to develop my winning business idea: how to continuously re-assess a policyholder's health at a reasonable cost and thus be able to offer variable cash surrender values.

Here is the suggestion I deposited in the Red Suggestion Box outside the company president's office:

Sell a permanent life insurance policy (with reserves and cash surrender values) to an individual. With his permission, implant a continuous monitoring device in his body of the type Dr. Whitney has developed. Based on feedback from the monitoring device, alert the policyholder to any physical problems that might be developing so that early remedial action can be taken. This would enable him to lead a longer, healthier

life; and it would enable the company to perform a continuous assessment of his health and remaining life expectancy, and provide variable cash surrender values any time the policyholder elected to discontinue his insurance policy. These unique features should enable the company to be very competitive in selling large insurance policies to wealthy, discriminating individuals.

After I deposited my suggestion in the Red Suggestion Box, I didn't give it much thought. It was a rather futuristic idea and there would be lots of details to work out. We were a progressive, even aggressive, company but there were limits. So, I was pleasantly surprised when, a few weeks later, the president asked me to save today for lunch and explained the purpose of our meeting.

Our lunch went pretty well. The president was suitably laudatory and even inquired about my hobbies and other activities outside the office. The medical director was less forthcoming in his praise, presumably because I had appropriated his pet project to win my award.

We ate in the company's executive dining room. I was a little disappointed because I'd hoped we go to the president's city club, or at least one of the area's upscale restaurants. But I guess the important thing was the award for the Best Business Suggestion of 2010: the \$25,000 check, the promotion to vice-president-product development, and the month long all-expense-paid vacation for two at Hotel Bora Bora in French Polynesia.

As I mentioned earlier, this was all I could want—except for one thing. And I decided to enlist the president's aid in an effort to gain that one thing. After all, he had opened the door to this subject by inquiring about my outside activities.

I asked the president to assign the task of screening the contents of the Red Suggestion Box outside his office to Alison Bryant, the medical director's assistant. Temporarily, just for tomorrow. (I knew the regular screener was going to call in sick, because I had asked her to do so.)

The president seemed somewhat perplexed at my request, as did the medical director, but he granted it. After all, he couldn't risk stifling the creativity of the winner of the Best Business Suggestion of 2010.

We adjourned from the company dining room and I closed the door to my office as I wrote a note to deposit in the Red Suggestion Box for tomorrow's screening.

Dear Alison,

As part of my award for making the Best Business Suggestion of 2010, I was given a month long all-expense-paid vacation for two at Hotel Bora Bora in French Polynesia. I've heard it said that:

*Ten years from now
You will be more disappointed
By the things you did not do than
The ones you did do.
So, throw off the bowline,
Sail away from the safe harbor,
Catch the trade winds
In your sails.*

EXPLORE, DREAM, DISCOVER

That sounds to me like good advice and I don't want to have any such regrets, so I am hereby asking you to accompany me on this trip to Bora Bora. I hope you will say yes.

Your long-time admirer,

Alex Morgan

Later that afternoon I found a note in my in-box, which said:

*To: The Audacious Winner of the Best Business Suggestion
of 2010*

From: Alison Bryant

*I have reviewed your most recent entry and judge it
to be the Best Non-Business Suggestion of the Year.*

*My answer is yes, let's explore, dream, and discover
together.*

I thought you'd never ask.

* * * * *

As I said before: What more could I want?

2,893 words

The What Ifs

Steve Mathys

It was a cool, crisp spring morning. Annia had just gotten out of bed. Not that she'd slept much – the anticipation had kept her tossing and turning most of the night. She quickly rushed through her morning routine – shower, hair, makeup, clothes – to get downstairs and snap the tv on. They were showing the local morning news, and she flitted around the small kitchen nook of her apartment, listening half-heartedly.

It was Draft Day, the day she and the rest of the Prospectives had been waiting for. Together with about thirty other ladies from various preparatory colleges across the galactic arc, she'd been living in this dormitory the past three months, practicing and hoping. Some prayed, too, but that just wasn't for Annia – too much uncertainty in that. She liked things she could control.

Like yesterday – at the afternoon combine workout. There had been seven scouts there, from the Rayders and SparkNet and Epsilon 3*, among the rest, watching them go through their paces. Drills, sprints, defense, play-calling, quick learning, decision-making, leadership. Leadership – that was really in vogue these days. She'd performed admirably, she knew, driving her squad through wormholes and across hyperspace, only to pop out on the other side of the field with the plutch in tow, ready to score before the other squads knew what hit them. That was the important thing – thinking three steps ahead of your opposing captain, anticipating their reactions to what they thought you planned so you could outmaneuver before they did.

A few times, Annia had met up with stiff competition. Kaylene, for one, had given her fits the first six minutes of their scrimmage a few weeks ago. They'd been down ☀☀ to ♦↗ before they knew what hit them, and it wasn't until almost halfway through the second period that she'd been able to figure out that Kaylene was a sucker for Planck and patterns. Every third, then fifth, then fourth move she took her team, dropped down small, and popped back up exactly 3/5 of the field away, to the northeast. Once Annia saw the pattern, it was relatively simple to predict when they'd hit the smallness, and where they'd come back up. Annia took a time out and explained what was going on to her squad.

“Listen,” she'd said, “I've got her figured out. They're following a pattern.” She looked around at the other girls. They leaned on shoulders, heads hanging down, scowls covering their faces along with the extra fluzz that marked the boundaries and always drifted up from the surface of the water. “Follow my lead, we'll get them in about three plays.” They broke the huddle with nobody confident in her, but three plays later, a few seconds before Kaylene

disappeared again, Annia shouted, “To me, Farstriders! To me!” and they rallied, she took them to Planck length, transversed the distance in a microsecond, popped out of the miniature foam world, and were waiting when Kaylene and her team showed up an instant later, surprise covering their faces. Annia’s forwards took the ball and they quickly marched through the playspace, scoring on the disoriented opponents easily and often afterwards.

Annia had leadership. She knew it – she could see the game, see the field, learned things quickly. Even better, she had Leadership. That quality everyone seemed to be talking about – that ability to get people to do what they needed to do, even when they didn’t want to or couldn’t think about it themselves. She had Leadership, just like she had Poise, Finesse, Skill, Fitness. She knew all these things – she knew them, she lived them, she breathed them.

A chime at her door shook her out of the reverie. “That’ll be Jack,” she thought. Her agent – her friend, her confidant, the one who would soon be seated next to her in that big ballroom, surrounding her and her friends (and competitors!) with excitement, anticipation, and the promise of fat salaries. She opened the door and saw Jack there, all right. He was wearing a Suit. He looked distracted.

“Everything all right?” she asked. He looked up, and the concern was evident on his face. Never one to smile at odd times, Jack at least always looked pleasant. He was short, shorter than her meter ninety-five, but thick and strong. He looked like he came from somewhere offworld, but she’d never asked. Theirs was a business relationship, of course, and what he wasn’t offering, she wasn’t mining for. But today he had on a look that was more scowl than anything else – pinched lips, furrowed brow, hunched shoulders.

“Ah, well, ah-“ Jack began, then stopped. He put on a face smile, stuck out an elbow for her, and jerked a thumb at the waiting cab. “I’ve got some news for you. I’ll tell you later.”

The cab ride to the Perseus Theater was uneventful – Annia was nervous, Jack always quiet, so they simply rode and watched. That was okay with her – she always like watching the city go by. Though confined population groups of 25 million people can hardly be called simply a city. She had often thought that Celsin needed a different title – something more imperial, befitting its central importance in this sector of the galaxy. Not just a city – a *homeplace*, perhaps? Or *province*? Maybe a *potentate*. That had a nice ring to it. She said it out loud – “The Potentate of Celsin”, Jack turned to look at her.

“What?” He looked calmer, back to his old self again.

“Nevermind,” she shrugged, and patted him on the shoulder. She realized he would be just fine. His distraction earlier must just have been nerves.

*

The Grand Ballroom was decorated to fit its name. The ceiling was a full ten meters above them, hung with lavender-crystal chandeliers, a simple commodity on a half-dozen other planets around but priceless on this one because of their rarity. The huge space was at least a hundred meters wide, and twice as long. The expansive walls were hung with tapestries twice as long as she was tall, in staggered rows all along the sides, making a quaint checkerboard pattern. It reminded her of the Farstrider pitch – here’s in play, there’s out, right next to it is in again. Round tables were spread out all around, not too high and not too low, set with golden place settings (vice versa to the lavender chandeliers – they were cheap but looked really fancy anyway) and half-filled with chilled hors d’oeuvres waiting for them and everyone else. The lights were dimmed, creating a quiet, yet anticipatory atmosphere. At the other end of the room she could see the stage, brightly lit, with dozens of camera crews setting up microphones and vidcaptures, the excellence of their workmanship evident in the miniscule size. She guess that at least thirty cameras were trained on the stage, and all of them took up less space than a dinner plate.

There were already a few hundred people in the room. Annia recognized some of the girls from her Training Regiment, and saw a couple of agents who had first tried to get her to sign with them before Jack. She waved around, smiled a lot, and followed Jack as he worked the room. Eventually they reached their table, about a third of the way back from the stage. *This is good*, she thought to herself. *Somewhat close, but not so much so that it looks like I planned to be the Number One draft.*

Because of course she didn’t – of course not. At least, that’s what she out loud said when anyone asked – she didn’t expect to be first draft, there were so many other talented ladies out there ready to go, she was just hoping to find a place that she could fit in and contribute immediately, she would be a team player, and all that. But inside, she knew. She could feel it in her bones – she would be the Number One draft pick, and it would be all smooth from there.

They sampled the hors d’oeuvres, drank a small toast, and settled in to listen to some of the preliminary speeches. In between she and Jack chatted with the other attendees at their table,

had another toast, and ate their main dishes, served excellently and precisely by the accomplished staff.

Finally, the draft was about to begin. The Commissioner had gotten up to start her ceremonial pronouncement, when Jack leaned over to her and whispered in her ear. “Annia, we’ve got to talk.”

She squinted back at him, and whispered, more harshly than she intended, “Now? But the draft is about to start.”

He nodded. “I know. It’s about that. Let’s step outside for a minute.”

Confused, she reluctantly stood up and started making her way through the tables. In the time it took for them to reach an exit, the Commissioner had announced that the Columbia Churn were on the clock, and they had fifteen minutes to make their pick. Frustrated that she might be out of the room when her name was called (Columbia *had* sent a full contingent of three scouts to the practice squad last week, and her interview with them *had* gone swimmingly, and she so *did* want to live in a zero-G colony, and there *were* so many opportunities with a team that had so much raw talent and a new coach and at least three picks in the first round, and they *had* intimated that should she be chosen, she might also have influence on future picks, to help round out the squad), she grasped Jack’s elbow and spun him around, making his Suit lapels fly open as he turned.

“What’s going on?” she demanded. She stared down at him, glowering. “We’re missing the draft!” She could hear the murmurs and general anticipation coming from the room behind them, and it bugged her not to be there – to be part of that building excitement.

Jack looked worried again. “I’m sorry, Annia,” he began. “It’s never easy to do this.” He stopped, put his hands on his hips, and straightened. *Must be bad news*, she thought. He continued in an uninflected voice that she knew was coming from the businessman side of him. “You’re not going to be drafted today. It’s not going to happen.”

Stunned, Annia couldn’t do anything for at least a few seconds. Finally, she shook her head and managed to sputter, “What? What are you talking about? Today’s Draft Day – there’s fifty teams here, looking for the best Farstriders there are, and I’m it! I’m her! I’m she! I’m–“ she trailed off. “What?”

“You’re not going to be drafted today. I’ve been talking with the coaches all week, and they’re all telling me that they can’t take the chance with you.” He hung his head, turned away. “I’m sorry, Annia. I’ve done all I could do.”

Inside the ballroom, the Columbia coach was back to the microphone, speaking again. Vaguely she thought she heard the name “Kaylene”, but it was all a blur of sound and sight, her eyes brimming with tears. She fought to hold them in. Steeling herself, she swallowed hard and turned Jack by the elbow again to make him face her.

She realized that he looked as bad as she felt – stricken, overcome. Overwhelmed. She spoke slowly, careful to pronounce each word clearly so she knew she was saying it right. “What...are...you...talking...about? What’s the risk? I’m the best player on the field. I bet I could score thirty Solos in the first five games alone!”

He nodded. “The projections were for twenty-eight in the first six. And a dozen more Groups. Not bad stats for a rookie. But it goes downhill from there.” He pulled out his palmputer and tapped the screen. “In eighty-five percent of the simulations, you get hurt somewhere between the eighth and tenth game of the season, and your career is over. In over half of the rest, you make it through the first season, but hold out for more money in the second – putting your team over the salary cap and forcing them to cut other necessary players. A few have you making two full seasons before getting antsy, and wanting out.” He looked up, dejected. “There just aren’t enough in which you provide a positive ROI, and, unfortunately for you, that’s a problem.”

“Simulations?” She was confused. “What simulations?”

He held up his palmputer, and the display was covered with small bars of varying colors and sizes. “These simulations. Run by the Office of Sports Science. They’ve got a model for the whole league. This represents about, what, ten quintillion scenarios? They had to go that high because of all the options you had in front of you. Not to mention all the other Prospectives, too.” He shook his head. “It’s too bad we didn’t find this out sooner. We could have managed the last month of Training Regimen a little better, perhaps set some expectations a little lower...” He trailed off, but she was still confused.

“Simulations? Models?”

He nodded. “The what-ifs. What if you get hurt? What if the Rayders take Mercy Jones instead of you, how does that work in game 5? What if there’s a drought and all the water is

needed for irrigation and there's no fields to Farstride on?" He looked up and caught her eye. "What if you get hurt, because you're going for one more Solo, when you really should have passed it on to your Backs?" He bit his lip, the concern clouding his face. "I'm sorry, Annia, like I said, there's nothing I can do now. We've come so far, gotten so close..."

She grabbed him, then, and hugged him. For no reason why, she wanted to hug him, so she did. After a moment, he hugged her back.

*

It would be another week before Annia would be reminded of simulations or modeling. The intervening days were filled with calls to her mother, a couple more discussions with her father, an interview with a news crew from her hometown that had known she was eligible and wanted her thoughts on why she might not have been drafted, a few days of just sitting in the apartment doing nothing. Here she was, living in one of the nicest suburbs of the biggest city on the planet, heck, the biggest in the solar system, and she couldn't find anything more to do than sit and watch television. Even reading a book had seemed too difficult for her. She guessed it was depression. And no surprise there – everything she'd been working for the past eight years had gone out the window, disappeared, just like that. Poof. She pursed her lips and whispered to herself often, "poof", enjoying the sliding feel of her breath across the gentle edges of her lips.

And so, after a week of wallowing in her own self-pity, Annia decided to go for a walk. Oh, she didn't have to do much for a while – the Training Regimen salary had been enough to put down three months' extra rent on the apartment, and her savings would pay for food and the small bills she had, so she could just take some time to think. One of the things she thought of, when she finally realized that she was thinking, was that a walk would be nice.

So she stepped out onto the street, half an hour after sunset, with a light windbreaker pulled over her toned shoulders. She stretched, and felt some pent-up energy inside her body, energy that had been looking for the release of training for a while and hadn't gotten it. So she swung her arms vigorously while she walked, and enjoyed the night air, and looked around at all the people.

The neighborhood where she lived was close to the city proper, yet not crowded. There were some single homes, some single businesses, but most of the places were combination storefront on the lower floor and dormitory on the upper three or four floors. She was living in one of those, on Market Street, half a mile or so from Quamercy Park, where on Saturdays in the

summer there would be locally-grown vegetables and hand-crafted goods. On other nights there were often gatherings of artists, musicians, flakeboarders, politicians, or just about anyone else who had a need to meet others of similar disposition. Hearing a bit of noise coming from the Park, Annia headed in that direction. There were couples and singles walking, the occasional family with children, some old, retired men and women sitting on park benches or waiting for a bus. “How old-fashioned,” she thought, “taking a bus when we’ve perfected wormhole travel.” But she stopped herself, and remembered that things like that were still somewhat experimental, and still slightly dangerous. Of course they were – didn’t all Farstriders sign a contract before each practice session that indicated they knew there were risks with the technology? And that they held no one but themselves liable if something happened? And that they were not entitled to any kind of compensation whatsoever from malfunctions or misuse of the bips, no matter whether they were used offensively, defensively, or neutrally? And that... “Maybe they’re not old-fashioned after all,” she said under her breath.

A voice at her elbow startled her. “Who?” it asked.

She looked around, startled out of her reverie, to see a young man, probably only a couple of years older than her, sitting on the edge of the low brick wall that ran around the park, swinging his legs back and forth and smiling up at her. She could hear louder noises now. The Park was filling with couples carrying baskets and blankets – there was a gaggle of unkempt men slinging instruments around off to her left, probably a concert – and so she leaned a little closer so she wouldn’t have to shout.

“The old people who take the bus,” she said. He smiled, a crooked smile that made his eye squint. He had short, dark hair and was wearing jeans and a pooska-skin jacket. It looked good on him. She smiled back.

“I like the bus,” he said, and hopped off the wall. He slung his arm through hers, and, as if her approval was all but given, started leading her towards the band. “It gets me where I’m going, and I can read a book while I’m getting. Come on, the Shin Kickers are about to start. They’ve got some great stuff.”

Annia followed him, and they listened to the Shin Kickers for five or six songs. In her opinion, they must have been saving the great stuff for the second set.

When the band took a break, Annia and Kelvin (“Like the degrees,” he’d said, but she had no clue what he meant) walked out of the park, talking. Soon she was telling the story of

Draft Day, Jack's shocking revelation, and her subsequent disappointment and confusion over what she should do with her life.

When she stopped, he just looked at her for a bit, then tilted his head to the side. "Wanna come back to my place? I've got something to show you."

She backed up a bit then, and held up her hands. "Sorry, I'm not that kind of girl," she said.

He looked confused, then embarrassed. He actually blushed. "No, that's not what I mean. No funny business, I promise. I've got a hobby – you might be interested. Can you take ten minutes to come look?" He put puppy-dog eyes on, and she couldn't resist.

"Okay," she said, "but for reals – no fooling around."

He crossed his heart and hoped to die. She didn't believe it for a second, but it *was* fun to watch him try to pretend he hadn't been thinking about that at all.

His apartment was twice as far from the Park as hers was, and they went north on Einstein Boulevard to get there. They chatted generally about background and the Shin Kickers, and Annia kept her arm graciously free of his. Though he seemed friendly enough, she still felt cautious. Like she just didn't want to believe there were nice boys left without girlfriends. She wondered what strange, crazy things he would reveal behind Door Number Three.

It turned out that there wasn't anything strange and crazy behind the door, just his roommate, Zane. Who glanced up from his journal when they came in, grunted, and went back to writing. Kelvin led her through some general apartment debris to what could be a bedroom, filled with a computer desk and a large aquarium that was, curiously, empty. She stared at it for a minute while he jibbered around with the computer and some stacks of papers. When he turned back, and saw her staring, he actually blushed, and grinned sheepishly. "Ah, long story," he said, pointing. "Let me just say, always know who your pets' toxic prey *before* dinnertime." She cocked a head, and gave a little laugh. He turned back to the screen, where there were hundreds of little colored dots floating around, bumping into each other, sometimes merging, sometimes separating, but never still.

"What's that?" she asked. "It looks interesting."

"Screensaver," he replied, and wiggled the mouse. The picture disappeared, replaced by a plain screen with nothing but a cursor. Annia was mildly disappointed.

Kelvin spoke again. “You said there was a model that predicted you’d fail out of the Interstellar Farstrider League within a couple of years?”

She shook her head. “Not fail out, no. Injury. Career-ending.” He nodded, and clicked some keys. She watched symbols flash across the screen, too fast for her to understand. It didn’t look like writing, though. She was confused. “What’re you doing?”

“Calibrating my model,” he said.

“Model? Of what?”

Kelvin turned and looked at her with an expression she’d once seen on her grandmother’s face, when she asked what a *biscuit* was. As if everyone in their right mind knew what a biscuit was, and Annia was a fool for not knowing. And an even greater fool for asking about it.

“Of what? Of the draft, silly. I had run a simulation about a month ago, to see if I wanted to get in on this pool at work, but it was a bit too squishy for me. They were offering 1-to-4 odds that the Rayders would take you first, but I thought that it should have been more like 3-to-2, so I didn’t play. I guess in that case, it might have been good to get in on the house bet.”

“Why?”

“Why what? Why not bet? The anticipated payoff wasn’t enough for the risk, so I didn’t go for it.” She shook her head, but before she could say anything, he continued. “Oh, you mean, why the simulation? It’s something to do, I guess. I run lots of model simulations.”

“Eh?” she asked, still not getting it. “What for?”

He shrugged. “I like to know what’s going to happen. Sometimes I can make a bet and win, sometimes I can just know what’s going to be the cheapest price for toothpaste in two weeks. It’s just a hobby.”

Annia knew that there were models out there in the world. It had been part of her course of study at Windahm, *Modeling the Real and Imaginary Worlds*, a required course for all sophomores. Required because simulation was everywhere these days, and because all employers seemed to want that ability in their new hires. But she hadn’t really cared, gotten a B-minus, and let all that stuff drain out the back of her head when she finished the semester.

Of course, there were dozens of sophisticated modeling techniques. And people had simulations for just about everything – for the price of stocks, cars, food, or fuel. For the way that the weather would be affected by this research body’s new cloud seedlings, or that rogue

government's testing of nuclear missiles. For the motions of rockets and fish and herds of pooska.

But she had found all that stuff too theoretical, not practical enough. So what if it was a 65 percent chance of snow tomorrow? There was still a 35 percent chance of no snow. And since Annia appreciated those things that she could control, it didn't do her any good to think *maybe* about everything that could happen. So she dealt with the thing immediately in the way, and once that was conquered, moved on to the next thing. That was a lot better than trying to think today whether or not there would be rain tomorrow. It would rain whether she set out her raincoat or not – and if she did when there was no rain, that was wasted effort. So she preferred to just look out the window when it was time to leave, and go from there.

Models hadn't really played a big part in her life, therefore, the past years. At least, not until this week, when that damned model from the Sports Information Office had screwed her out of the Number One Draft Pick, had raked her over the coals of the Training Regimen for nothing, and all she wanted to do was drive down there with a flakeboard and just start swinging.

Kelvin was trying to get her attention again. Slowly she brought herself around to focus on him again, and realized he was asking some questions. "Do you mind?"

"Sorry, I wasn't paying attention. What did you say?"

He grinned. "I know, I could tell you were off on Calypso 3 or something. I wanted to ask if I could do something. If I could run a simulation. On you, I mean." He blushed, and she felt herself doing the same. "Will you let me do that?"

She agreed, and thus began the longest night of her life.

*

Five days later the simulation was done. They had agreed to meet back at the entrance to Quamercy Park again, an hour after sunset again, and get a cup of go-ava nectar and discuss the results.

She and Kelven were in the Juice Bar across from the park. Annia could feel some butterflies in her stomach. Nervous! She hadn't been nervous in a long time – not even before Draft Day. What had there ever been to be nervous about? She was in control, she knew what she was doing, and she didn't have time to get nervous – just go with the flow and make the best of the situation. But now, she couldn't explain it. There was an anticipation inside that represented some unrequited desire for adventure, for importance. For meaning in the world.

She sipped while he took his palmputer and a short stack of papers out of his shoulder bag. He took some time to get settled, and soon she had calmed again. She stared while he organized, flipped through pages, sorted this way and that, and finally sat back in the thick arm chair with a satisfied grin on his face. “I think you’re gonna like what I’ve got,” he said.

She waited for him to continue, and he finally got the hint. “Okay,” he said, leaning forward and placing his fingers in a spider-leg shape on the stack of papers perched on the low table between them. “This is the questions and answers we went through last week, to calibrate the model.” She nodded, and he continued. “And over here,” he flashed his palmputer, she could see it was covered with lots of different colors, “I’m hooked in to my mainframe back at the apartment. I’ve got the results of the simulation, and I think you’ll be pretty happy. Or should I say, *Happy*.” The way he said it, emphasizing, made her think that there was something different about that happiness. Like it was something special – not just for normal people.

Kelvin straightened, and touched his palmputer a few times. The colors danced, and she could see numbers scrolling across the bottom. “What you’ve got,” he was saying, “Is a ninety percent chance of your DHF being greater than 1. That’s a good thing!” he grinned at her. “You want that number to be above one, it means you’ll likely be happier later in life than you are today.”

She snorted. “Ha, not very hard to do that.” She finished her go-ava nectar and silently wished he’d offer to get her some more.

He shrugged. “Yeah, I figured you’re a bit down right now. So what I did was also look at the chance you’ll be happier than two weeks ago. Today is the baseline – your DHF is set to one-point-oh, and from there I backdate just a-“

She held up a hand to stop him. “Wait, stop. What’s ‘the DHF’ mean?”

“Discounted Happiness Factor. It’s a measurement I came up with to be able to rank the scenarios, so you can actually evaluate them. I figured, it probably doesn’t help you to know that in like 10 years you’ll be five times as happy as you are now, unless you know what will happen in the mean time. Maybe you have to go through some horrible accident to make you appreciate how good you’ve got it in ten years, so that might lower your DHF overall. Another scenario, you’re just generally getting happier all the time – higher DHF.

“So this number is like the cumulative happiness over your whole remaining lifetime, compared to how happy you are now. I take some off for later time periods, too, because that’s

more uncertain, less likely, so there's a bigger chance I could be wrong. But with this, you can look at what might be, maybe make some decisions differently, avoid something bad just around the corner." He looked up and caught her eye. "Even be on the watch for opportunities that are coming your way," and he winked at her. She blushed again. But why?

"Okay, so what does it all mean?" she asked, craning her neck to see his palmputer display. He turned it a little more so she could see better. The patterns had settled down. They looked a bit like a ski slope, with the high end off to the right and the low end, with the jump, at the left. There was a little 1.0 number, at the bottom, with a vertical yellow line sticking up from it.

He put his finger on the yellow line. "That's the baseline," he said. "It represents where we are now – how happy you are." He pointed to the left, where the little ski ramp was. "These scenarios down here, about 1 out of every ten, suggest that you won't be as happy for the rest of your life, as you are now." He dragged his finger along, past the 1.0, along the uphill part. "These other scenarios, about nine of every ten, suggest you'll be happier for the rest of your life than you are now. You want to know your future?"

The butterflies were back. "You can tell my future?"

"Well, not exactly. I can tell you what the result of a certain simulation is, what happens in it. Like this," he tapped in the middle, to the right and about half again as high as the baseline. Soon his palmputer was scrolling data faster than she could comprehend. He dragged a finger, slowing it down, and read in a monotone. "You live here on Celsin for another three years, end up coaching for the Rayders, and get transferred to Triton Six where their minor league team is. You meet a man, fall in love, have three kids, work as an administrator at a college, send two of them to said college and the third gets drafted into the military, take six trips around the world, eventually get to travel back to Old Earth, and die at eighty-six, three years after your husband." He looked up. "That's not so bad, is it?"

She thought about that for a while. While she had never given much thought to marriage and family, it was rather quaint and satisfying to think that she'd have some purpose and quite a lot of happiness in her life, at least compared to now.

"So are they all pretty much like that? Get married, have kids, die happy?"

He shook his head. "Oh, no," he said, and tapped a few times on the screen. "This one," he read again, "You go back into the Training Regimen as a free agent, trying to prove yourself

again. You get drafted by the Hawks and end up riding the bench for two years, then move up through the ranks to Captain. Your life ends tragically at age 38 because of a freak wind accident, but you've been so successful and planned so well that the foundations you started help hundreds of thousands of people with disabilities each year to manage their lives better. No kids, no husband, but you are often quoted as saying that 'The world is your family.'"

She frowned. "So what? Can you tell me what's going to happen?"

He shook his head. "Nope. But I can tell you how likely certain things are." He tapped the screen a few more times. "Sixty-three percent chance of marriage... twelve percent chance of getting back into Farstriding... twenty percent chance of going to Old Earth! Hey, that's cool!" He grinned at her.

"When do I get to be President?" she asked.

"Zero point zero zero zero six percent chance of Presidency within twenty to forty years," he said. "Zero point zero zero zero seven percent chance overall."

"Do you have probabilities for everything?"

"Just about!"

"Is there anything that doesn't show up there? Like, what if I pour coffee on your head tomorrow, any simulations come up with that one?"

He shook his head. "Nope, nothing that specific. But there are about one in every fifteen where we start dating within the next week." He winked at her. "One in five chance within the next month."

A moment passed before she continued. "So how do I make sure I get one of these happy lives? How do I guarantee I'm up here," she pointed to the right side, where the most happiness was, "and not down there?"

He frowned. "Well, now, that's sort of a tricky situation. I can't guarantee anything in your life. Neither can you." He stood up and stretched. "And, unfortunately, none of these simulations will actually come true."

She was now confused. "What do you mean? Aren't these possible futures? I'm going to get one, aren't I? I thought it was just a matter of following one of these paths, to make sure I get what I want."

He shook his head. "It's not that easy. If it was, everyone would just run a simulation, would pick the one with the highest DCF, and do the next thing that says to come up." He

tapped again. “This one too has you ending up with the Storm next year, not the Rayders, but you...” He trailed off. “You know what? It doesn’t matter. None of these matter. They don’t matter because they’re not going to happen.”

“But what if I want one to happen? How can I make it happen? How can I get my maximum DHF?” Annia tapped the screen impatiently, making the colors dance. She watched them eventually settle, producing a similar calming effect in her mind. She was beginning to understand what he was talking about.

If he had never created that simulation, she might have gone about her life just like before, not knowing that there were all these possibilities. But now that he had, she had more information than before. She had things she could act on, she had questions she could ask herself and others. Options could be explored. Avenues pursued, decisions made. She was no longer at the mercy of the universe – maybe now she could take the control that she had so long pressed for. Perhaps she could direct and pursue exactly what she wanted. Even being President! Zero point zero something chance – but not nothing at all! Maybe she *could* be President. Maybe she could get back into Farstriding. Maybe she would get married. All she had to do was figure out what life she wanted, and follow the next step. But what if the next step depended on her not knowing that it was available? And how she would end up if she followed it without knowing?

Annia spoke slowly. Kelvin listened but remained silent. “So if I never knew about these options, these simulations, I might have just gone on my way, with a, what, sixty-three percent chance of getting married? But now...now that I know about that, maybe I make different decisions. And maybe I now have a different chance of being married. And a different chance of being President. And a different chance of breaking a leg, or of dying in a surfing accident, or of...everything.” She looked at Kelvin a long time without saying anything. He went back to the bar and got them both new drinks while she thought, and they sipped in silence a little longer.

“So now that I know this,” she said, and spidered her fingers on the palmputer, much like he had done earlier, “everything’s different.” He nodded. “I don’t have a zero point whatever chance of being President.”

“Nope.”

“So what is it now?”

He shrugged his shoulders. “Can’t say. I’d need another model run.”

“How long would that take?”

“About the same as before – four or five days.”

Annia leaned back against the supporting cushion of the couch and wondered. Was this really the way she wanted to go through life? Waiting five days to make every decision? Answering a hundred questions each time she considered whether it would be better to buy an imported or domestic hovercar? Second-guessing each and every little thing, to determine if it was adding to her DHF?

Annia held out her hand, palm up. “I think you said you’d make me an app,” she prompted.

He grinned, blanked the screen on the palmputer, and popped a tab out of the side. He handed it to her. “Just drop it in any card slot you have, anywhere, and you can look at that simulation again. Do all the research you want. Review a scenario, look at statistics, find the best thing you can.”

She nodded, and stood to leave. Kelvin didn’t, and she kind of understood what he was doing. He was letting her have some space. That seemed good. She dropped the tab inside the pocket of her spring jacket, and gave him a little smile and wave, thanking him again for all he did. With a small nod of agreement, or maybe it was a hidden wish of good luck, he bid her goodbye.

*

Back in her apartment, Annia stood still over the trash bin. She was holding the little tab in her open palm, staring at the possibilities she couldn’t see – couldn’t even imagine. There were twin desires within her – one to destroy it immediately, one to shove it as far inside her laptop as possible, never to be removed, so she could consult it daily, hourly, to ensure she was always on the best possible path. The strains on her in both directions were so strong, she felt as if she were being gravitationally squeezed again. She’d had that once, just outside the event horizon of Ceta Zeta Finna, and shuddered a little at the memory.

But she couldn’t decide what to do. She desperately wanted to know what was on that little tab – and yet, at the same time, she desperately feared what it might do to her. It would make her a slave to itself – despondent when it wasn’t predicting right, euphoric when it did.

The tension squeezed her throat and chest, making it hard to draw breath. She could feel herself getting toxic, needing to do something, anything, to break the spell.

And so, for about the first time in her life, Annia did nothing. She stumbled across the kitchen and opened a small drawer where she kept some other important and placed the tab carefully down next to a plastic comb and a small wooden box. With absolutely no determination at all, she gently closed the drawer and stepped away, and as she did, the bonds dissolved around her chest. She was ultimately, eventually, finally, able to breathe. But, then again, *what if?*

“Awakenings” by Ben Marshall

He slowly opened one crusty eyelid, struggling to focus on his blurred surroundings. He could feel the thump-thump-thump of his pulse pounding out its amplified drumbeat on his right temple. “Helluva hangover,” he thought bleakly.

With his right eye still closed, he managed to dispel the visual fuzziness with a deliberate squint. His left eye then proceeded to scan the room in periscope fashion.

The room was not much to behold. The walls were bare and painted white. Plain white linens covered his lower body and the bed on which he lay. The blond wood furniture was virtually empty. The lighting for the room was undoubtedly artificial – there were no windows in the room.

“Where the hell *am* I?” he thought, struggling to remember the events of the night before. In the midst of this brief mental quest, a loud beeping sound halted his thought process. He quickly opened his right eye, turning it to the far right side of the room in search of the source of the noise.

Standing in the far right corner of the room, with tubes and wires that reached across the bare floor tiles to the bed, was a bulky electronic machine. It featured a myriad of lights, buttons and switches. A trio of red lights were blinking in rhythm to the electronic beeping sound.

“What in the world...?” he exclaimed. At that moment, a tall, heavyset woman dressed in white scrubs rushed into the room.

He could only see her eyes and the edges of her face, as her nose and mouth were covered by an odd diamond-shaped white mask. The mask was lined with metallic nodes and projected a 3-D image in an eerie green light. In the midst of the green image were three red lights, pulsing to the rhythm of the beeps from the far right corner of the room.

“Mr. Katameros, you’re awake!” she shouted. “How do you feel?”

That was the moment it struck him – the knowledge that *he had no idea who he was*.

“Mr. Kata... Katameros?” he inquired.

“Yes. Adam Katameros.”

“But – but – who are *you*? And what am I doing here?”

“I’m Nurse Thompson. And you’re the first beneficiary of the Methuselah Solution.”

“The Methuselah what?” There was a tremor in his voice, and his hands began to shake with visible frustration.

“Settle down, Mr. Katameros – all in due time. For now, you just need to rest. It’s been a long journey.”

“A long journey? From where?”

“Not from *where* – from *when*.”

* * * * *

“What... what the hell are you talking about?” He stared at her, bewilderment in his eyes, anger on his furrowed brow. He propped himself up on one elbow to better engage the discussion with her.

For the better part of thirty seconds, she made no attempt to answer him. Finally, she replied, “I think you’d better speak with Dr. Radcliffe. I’ll make arrangements for her to visit you at the first opportunity.”

“What did you mean by – a journey from *when*?” He made no attempt to hide his contempt. “You and this doctor aren’t going to feed me some load of crap about time travel, are you?”

“Nothing like that, Mr. Katameros. At least – not *exactly*...”

Now the thump-thump-thump in his right temple was matched by a hammering sensation at the back of his head. “*What* – exactly?”

“I think it’s best if Dr. Radcliffe fills in the details. You’ve been through a lot. You’re sure you don’t remember...?”

“Lady, if I remembered, I wouldn’t be asking you to explain. I figure I must have really tied one on last night, judging by the jackhammer pounding inside my skull. I don’t remember much of anything from last night. Or any other night, for that matter...”

“Dr. Radcliffe was concerned that amnesia would accompany the procedure, at least initially...”

“The *procedure*? I’ve had some sort of surgery?”

“Not in the traditional sense. At least not from the tradition of your time.”

“Here we go again! *My time*? What in the name of God are you talking about?” The pounding in his skull was reaching epic proportions. For a moment, he thought he would faint.

“Your surgery was a newer procedure – one you wouldn’t be familiar with. It made it possible for us to test the Methuselah Solution.”

“Now we’re spinning in circles! Why don’t you just throw me on a merry-go-round and spin me until I vomit? That’ll accomplish about as much as the worthless explanations you’re giving me.”

“A ‘merry-go-round’? I’m sorry, Mr. Katameros; now *you’re* the one who needs to explain.”

He stared at her once again with his crusty, bleary right eye. His left eye winced with a migraine throb that encompassed his consciousness. And now the spinning seemed to become physical rather than metaphorical.

He lay his head back on the pillow. His eyes were fixed on a point on the ceiling, the axis of the room’s apparent movement. Consciousness was slipping away. He saw a look of concern in the woman’s eyes as one of the red lights on her eerie green mask began to flicker. The red light blinked off completely just as the room turned to black.

* * * * *

“Ah, there you go,” murmured a soothing feminine voice. “Adam, where *are* you?”

Katameros slowly opened his eyes. An attractive woman’s face leaned in toward his, a look of tenderness warming her eyes, a gentle smile curling the corner of her lip.

He peered slowly around the recovery room where he was now situated. “I’m on this gurney,” he rasped with a crooked smile.

The faint crows-feet at the edges of her eyes crinkled with the smile that his humour elicited. He noted the contrast of her cool steel-gray eyes with the warmth of her lush, rose-coloured lips. Her close-cropped hair had been vividly highlighted, creating almost a halo effect. He pegged her as mid-thirties, self-assured, vibrant, used to being in control.

“Can you sit up? Perhaps you’d like to take a walk with me...” her voice trailed off.

“Who *are* you?” he asked as he grasped the sides of the gurney and pushed his torso upright, his legs still horizontal.

“Eve Radcliffe. I’m your doctor. I performed the procedure that brought you back.”

“Brought me back? You mean I died on the table?”

“Not exactly.”

“Not this evasiveness crap again. What the hell happened to me?!” His eyes were once again ablaze with anger and frustration.

“Let’s walk, Adam. I’ll explain everything.” She eased his legs off the gurney and helped him stand. “Here, hold on to my arm until you’re steady,” she offered as his legs momentarily buckled.

They trudged down the whitewashed corridor, Adam’s hand on Dr. Radcliffe’s arm, until they reached a steel door with no handle. “Exit, Radcliffe with patient Katameros!” exclaimed the woman. The door slid open to reveal a bright outdoor patio beyond. The pair walked through, one at a time, Dr. Radcliffe leading the way while holding his hand.

* * * * *

The white cast iron patio furniture reflected the dazzling sunshine of a clear and balmy spring day. Katameros felt the urge to shield his eyes from the sunlight as they sat, but resisted so that he could look his doctor in the eye. He needed truth, and he believed he could discern it more readily with full eye contact. He motioned with his hand for her to lead the conversation.

“Where should I start?” she asked.

“Where any pitcher’s nightmare starts – at the big inning...” His crooked smile showed her that he was joking, but the reference escaped her. She regarded his swings of mood from frustration to humour and back as perhaps another by-product of the procedure.

“Big inning?” she queried.

“Yeah – baseball, you know. ‘Big inning’ – a pun for ‘beginning’? Not a sports fan, eh?”

“Sports, yes, especially air polo – but baseball? Never heard of it...”

“Holy sh**, you’ve led a sheltered life. I can understand never playing it – but never *heard* of it?”

“Must have been before my time,” she muttered.

“The *time* thing again, “ he answered. “Lucy, you got some ‘splainin’ to do!”

“Lucy? ‘Splainin’?”

“Before your time as well, and before *mine*, but I can remember the *I Love Lucy* reruns...”

“Reruns? What are reruns?”

“Let’s not go there. Just tell me what the hell’s going on. Where am I? And what’s happened to me?”

Dr. Radcliffe drew in a deep breath. “Are you sure you’re ready for this?” she asked with a worried expression.

“Ready as I’ll ever be.”

“Okay, it’s like this,” she began. “You’re a patient at the WCNMS. That’s an acronym for the World Center for Nanomedicine and the Methuselah Solution. We’re sort of like a global hospital, only our medical efforts are directed at one specific goal.”

“The Methuselah Solution?”

“Exactly. You’ve heard of Methuselah from the Bible?”

“Yeah, the old fart who lived the longest. Something like 969 years.”

“Right. According to Genesis, people used to typically live more than 900 years. Then came Noah and the ark. The flood wiped out everyone except Noah and his family, and all the animal kingdom except the pairs on the ark.”

“But isn’t the flood just an old wives’ tale?”

“Maybe, maybe not. Many people of faith don’t think so. *I* don’t think so. I’ve found fossils of sea life while hiking in the mountains, more than a thousand miles from the nearest ocean.”

“But couldn’t that just be from the primordial slime of prehistoric evolution?”

“Again – maybe, maybe not. But *if* the Noah story is true – and particularly if the story of his ancient predecessors is true, then something in the human gene pool fundamentally changed soon after the flood.”

“Changed?” he asked.

“Within three generations after Noah, the average life span had shrunk from 900 years to less than 100 years. One would guess that it had something to do with the vastly shrunken gene pool that existed after all but Noah’s family were wiped out. Apparently, Noah had a genetic defect, at least compared to the general population before the flood.” The doctor waited to make sure Katameros was still with her.

“But what does this all have to do with this hospital?” he questioned.

“That life span differential between 900 years and 100 or less years is huge. And if it’s related to genetics, it’s quite possible that something can be done... *to bridge the gap.*”

She paused to gauge his reaction. His eyes narrowed, and he could no longer hold her gaze. He looked upward toward the cobalt sky. “You mean...”

“We’ve been working on genetic engineering to alter the aging process, directed at recapturing the relevant gene structure that existed when people had a life span of close to a thousand years. Plain and simple.” She again waited to fathom his reaction.

His gaze returned from the firmament to fix on hers. He spoke slowly, deliberately. “So – what does that have to do with *me*?”

“You’re our first – let me find a way to put this delicately...”

“Guinea pig?”

“I think I’ve heard the historical reference. Does that mean ‘test subject’?”

“Of course. What do you mean by ‘*historical*’ reference?”

“I mean we don’t use guinea pigs as test subjects any more. And we haven’t for so long that the antiquated reference has fallen out of use for many decades.”

“The *time* thing again. Now I’m really confused...”

“You see, the development of the Methuselah Solution is only *half* the story behind WCNMS.”

“*Half* the story?”

“Yes. We have *one* goal – delivering the Methuselah Solution – but with the regulatory environment we’re in, we have a *secondary* means of reaching the goal.”

“What regulatory environment?”

“With regard to testing. The Global Council will not allow testing on live human subjects for the genetic engineering involved in the Methuselah Solution. It’s considered too dangerous. That’s where the ‘nanomedicine’ in our name – the ‘N’ in our WCNMS acronym – comes in.” She smiled weakly, not sure how to proceed.

He spared her the need. “So ‘nanomedicine’ is for genetic engineering on small laboratory animals – presumably ones other than guinea pigs?”

“No, not at all. It’s molecular level medicine, geared toward humans, not small laboratory animals. One of the things we do with nanomedicine is to develop and deploy medical nanorobots that repair the body from the inside – and we’ve even used them to alter genetic structures.”

“So there are tiny robots that swim around inside a person’s body in order to fix or enhance it?” he asked doubtfully.

“In very simple terms, yes,” she replied, “but in the case of the Methuselah Solution, they’re not used on live human subjects – only *dead* ones.”

* * * * *

“What the f***?” He stared open-mouthed, stunned. Finally recovering, he asked, “I’m the ‘first beneficiary of the Methuselah Solution’! Are you saying that I’m *dead*?”

“*Were* dead,” she corrected, “but you gave your consent to being a ‘guinea pig’ for the Methuselah Solution – or at least the arcane version of it – before you died. As did thousands and thousands of your generation and the several generations that followed. Which gave us a neat solution to the problem of not being allowed to genetically engineer live human subjects. We did it while you were dead, using molecular medical technology. If it works on you and enough of your counterparts, without significant side effects, we can seek Global Council approval for testing it on live human subjects. We will have reached the holy grail of medicine. No more short-term medical solutions that only prolong the inevitable to a cap of a hundred or so years. We can stretch the boundaries from a hundred to a thousand years – to provide virtual *immortality*.”

Adam’s brain was now on overload. He shook his head rapidly and blew out a few breaths slowly, trying not hyperventilate. “You’re saying I’ve been dead, and now am alive, genetically engineered to live a thousand additional years?”

“Or more. The sky’s the limit. We know that medical technology and environmental conditions *now* are vastly superior to those of Methuselah’s day, and that 969 years is low compared to what it could easily be. Maybe two thousand years, maybe more.”

“How long was I – *dead*?”

“Eighty-nine years. You went in 2026; it’s now 2115.”

“That’s a helluva long time. Why didn’t I rot away?”

“You really *don’t* remember, do you?”

“Remember *what*?”

At that moment, their conversation was interrupted by the sounds of voices shouting from beyond the courtyard walls. Dr. Radcliffe took Katameros’ hand once again, stood up, and said, “Let’s get you out of here. You’re going to need some spiritual counsel, and this isn’t the place to get it.”

* * * * *

Katameros found himself being led down another corridor toward another door. Dr. Radcliffe picked up two pairs of sunglasses along the way, from a desk that was positioned at one of the hallway crossroads.

“Those for shading our eyes from that bright sunlight?” Adam queried nonchalantly.

“Not really. They’re so we can go where we need to go without being recognized. I’m also going to change out of my scrubs. You’ll need to do the same. There should be some street clothes for you in the locker over there. You can use the nurse’s rest room behind the desk to change. I’ll pop into my office and be right back.”

Katameros found a pair of jeans made from a material he didn’t recognize. It was softer than denim but quite sturdy, showing no signs of wear when he accidentally caught the pants leg on the locker’s handle. He dressed slowly in the jeans, one leg at a time, after putting on a pair of jockey shorts, tube socks, and a yellow silk-like shirt whose material again defied definitive identification.

He stepped out of the rest room and saw Dr. Radcliffe, almost beautiful in a floral print spring dress that clung to her curves in all the right places. He reminded himself that she was his doctor and that he had been dead for 89 years, though his attraction to her made him feel undeniably alive.

“Let’s get out of here,” she gently commanded, once again taking his hand.

She handed him a pair of sunglasses as the rear exit door opened upon her voice command. They strolled together from the hospital toward the sidewalk, by all outward appearances a couple out to enjoy the lovely weather of a spring day.

“Where are we going?” he asked as they turned a corner to the left. He heard shouts echoing from the opposite direction, apparently from the front of the building they had exited.

“St. Ignatius Church, just a couple of blocks away. Sorry it’s Roman Catholic; I remember from your file that you’re Greek Orthodox, but there aren’t any of those around here.”

“I never was a religious man, anyway – at least I don’t think so. Why are we going to a church?”

“To see Father Brown. He’s a bit of an oddity, but I think he can help you. He’s more mystic than Catholic priest. I go to him when I need spiritual counsel.”

Within minutes, they were climbing the steps of the weathered and apparently ancient cathedral. The cornerstone showed a date of 2012. The sound of shouts grew louder from behind them.

Inside, their eyes adjusted from the brilliance of the sun to the dark reverence of the vestibule. A short, round-faced man with white hair, dressed in a black outfit with a clerical collar, approached them with a whispered greeting. His disarming smile and twinkling eyes made Adam feel immediately at ease.

“This is the one I was telling you about, Father,” confided Dr. Radcliffe.

“Ah, yes – Sleeping Beauty,” grinned the priest.

“They’re still telling that story?” asked Katameros.

“A classic. Though the means of conveying stories has been greatly altered from your time. But let’s not get into that now. We have bigger fish to fry. Almost as big as the ones Jesus fried on the beach with his apostles after His resurrection.”

“Speaking of resurrection, I have a lot of questions...”

“Quite to be expected,” replied Father Brown, “especially from a man who never walked on water. At least I don’t suppose you did...”

“I don’t remember anything I did. I have no answers – only questions. Like how I was dead for 89 years and now I’m not. Um – I’m *not*, am I?”

“In the physical sense? No. You are alive and quite corporeal, as are the lovely doctor and I.”

“So how did I not rot in the grave? I mean, eighty-nine years is a lot longer than three days.”

“Ah, I see you have no recollection of the events precipitating your current state of unusual affairs. Perhaps the good doctor would be willing to recount the history.” He pointed to the sanctuary, and led them to a pew where they sat in a row, a body’s width of space between each. Katameros was in the center, with Dr. Radcliffe to his right and Father Brown to his left.

“You were one of the early policyholders of the Cryonic Life Insurance Company,” began Dr. Radcliffe. “Cryonic Life was the first insurance company to stumble on to the idea of providing a life insurance benefit that helps the person who *died*, rather than helping their *survivors*.”

“Helps a *dead* person?”

“Right,” interjected the priest, “Prior to that, life insurance buyers needed somewhat of an altruistic motive to induce the purchase. They never saw a dollar of their life insurance proceeds themselves, but rather it was paid to their survivors. But Cryonic Life, in the tradition of their capitalistic forebears, found a way to exploit the innate selfishness of the common man.”

“How so?” asked Katameros.

“Well,” continued Dr. Radcliffe, “as the name of the company implies, it’s based on cryonics. It involves a process whereby a recently deceased person’s body is frozen at very low temperatures, with the hope that healing and resuscitation may be possible with future technology. And the future is *now*.”

“What the good doctor failed to mention,” interposed the priest as Katameros turned in his direction, “is that from the 1960’s until after the turn of the 21st century, the prospect of healing and resuscitation after post-mortem freezing seemed extremely remote in the court of public opinion. However, Cryonic Life succeeded in convincing the masses that such healing and resuscitation was in fact plausible and even to be expected as medical advances unfolded, in much the same fashion that organ transplants became a medical reality several decades earlier.”

“How did that ‘exploit the innate selfishness of the common man’?” quipped Katameros with a sardonic smile.

“It created a whole new market,” the doctor replied, “people became willing to buy life insurance for their own desires, as opposed to buying it solely for their survivors. The insurance was to pay for the cost of cryonic preservation – including time-of-death expenses similar to those for major transplant surgeries, as well as storage of the patient in liquid nitrogen into perpetuity – the whole nine yards. Cryonic Life Insurance Company guaranteed that their clients’ bodies would be maintained for healing and resuscitation in such a way that information-theoretic death would not occur.”

“Information-theoretic death?” queried Katameros.

“Yes,” continued Dr. Radcliffe, “Information-theoretic death is the physical deterioration of the brain and the information within it to such an extent that the recovery of what constitutes the original person is theoretically impossible by any physical means.”

“Heavy stuff,” commented Katameros.

“Indeed it is,” continued the doctor. “A central premise of cryonics is that long-term memory and identity are stored in durable structures within the brain, and that these don’t require continuous brain activity to survive. You seem to be living proof that this premise is true.”

“I guess I am,” he replied, “although my memory is limited and I don’t really know what my identity was before I died.”

“Suffice it to say that you are at least not a blank slate,” said the doctor, “which dispels the fear that brain death would be equivalent to formatting the hard disk drive on one of your computers of the twenty-first century.”

“Thanks for the vote of confidence,” Katameros quipped, “so the fear of a formatted hard drive must have been overcome if people became willing to embrace cryonics?”

“Exactly,” replied Dr. Radcliffe, “people had to believe in the possibility of restoration – not only resuscitation, but recovery of identity – before they’d take cryonics seriously.”

The priest cleared his throat. “It took more than belief in the possibility of resuscitation and recovery – there had to be trust in the storage techniques. Cryonics went from quackery to visionary almost overnight in the second decade of the twenty-first century,” he added. “The end of its buffoonery took place with the onset of cryonics regulation, in the wake of the Ted Williams debacle.”

“Wait a minute. Ted *Williams* – the great *baseball* player?” He turned to Dr. Radcliffe and gave her a smile and a wink.

“Ah, so you do have some memories that precede your initial demise,” affirmed the priest. “Yes, that leviathan of the ancient and now-obsolete pastime of baseball, the ‘Splendid Splinter’ – who posthumously became known as the ‘Decapitated Driller’ – was unfortunately at the center of the inelegant case that ironically brought about the end of cryonics jeering.”

“Yes, I seem to remember – they froze his head separately from his body, and there was a big family fight about it,” recalled Katameros. “To make matters worse, rumours of his frozen head being accidentally dropped and cracked spread like wildfire.”

“Those charges were never proven,” said the priest, “but soon after that embarrassing episode, regulatory agencies intervened to develop standards governing cryonic freezing and maintenance processes. Not long after, cryonics began to take on an air of legitimacy.”

Dr. Radcliffe interrupted, “I don’t recall the Ted Williams affair, but I know that public opinion in the early days of cryonics was against the practice of neuropreservation.”

“Neuropreservation?” asked Katameros.

“Yes, the cryopreservation of the head, without the rest of the body. It later became much more fashionable, on the basis that the brain is the repository of the human consciousness. And in practical terms, neuropreservation was less expensive and less likely to cause damage during the freezing process. The head would be preserved, with

the intention of the future re-growth of a healthy body around the brain – using the same technology as for re-growth of a limb or organ, which was not possible in your day but is in ours. Alternate techniques which were once speculative but are now a reality, such as the development of a cloned body or an artificial body in which the brain could be housed, serve the same function.”

“So is this my real body? Or is it a re-grown or cloned or artificial one?”

“No, you’re built from all original parts, though the warranty expired a long time ago,” she grinned. “But seriously, we repaired your body from the cause of death and from the damage of cryogenic freezing, and we genetically engineered it for the Methuselah Solution before resuscitating you, all using molecular nanotechnology. We needed the closest available proxy to a live human subject so that we could extrapolate the results of our genetic engineering to the general population. And a frozen head just didn’t fit the bill,” laughed the doctor.

The sounds of shouting that Katameros had heard earlier began to grow in the distance. “That noise – I’ve heard it before. Anyone know what’s going on out there?” he wondered aloud.

“An unfortunate reaction,” replied the priest somberly, “the masses are asses, and they are looking for *you*.”

* * * * *

“Me?” replied Katameros in unfeigned surprise. For the moment, the priest did not respond. Katameros stood and moved past Dr. Radcliffe, up the aisle and toward the altar at the front of the sanctuary. His hands were trembling as he turned to face them.

The doctor was the first to speak. “All part of the Cryonic Life story,” she explained, “the company enjoyed great success for many decades. Its sales of cryonic life insurance policies exploded as people embraced the idea of future regeneration. People even overcame their sense of the macabre in relation to neuropreservation, bringing the practice of storing only the head into vogue in the last few decades. People saw advances emerging in molecular medicine that would indeed allow the re-growth of organs and limbs, and by going the post-mortem decapitation route they could significantly reduce the cost of cryopreservation and the attendant life insurance policies used to fund it. But then in the last decade, things began to go off the rails...”

“Heads began to roll?” asked Katameros with a nearly straight face.

“No, the financing began to fail,” replied the doctor.

“Human nature continued to fail,” retorted the priest, “Self-interest drove the sales. Mispricing drove the financial viability of Cryonic Life into doubt. Greed drove the timing of your resuscitation. And the masses weren’t prepared.”

“Now I’m *really* confused,” moaned Katameros.

“I think I can explain,” soothed the doctor as she stood and moved toward him at the altar. “You know about the self-interest. People bought the Cryonic Life policies because it gave them something for themselves – really, Cryonic bottled hope for the future.”

“Yes,” said Katameros, “I *get* that, even though I don’t remember *doing* it.”

“Yes, that’s odd, although it’s consistent with your partial amnesia. Anyway, there’s then the issue of mispricing – that’s another story,” said Dr. Radcliffe. “Cryonic Life built their pricing on assumptions, some of which nobody could reasonably validate. Assumptions about investment earnings on the premiums they collected, to help pay for ongoing cryopreservation maintenance costs. But more importantly, assumptions about how long the freezing would need to continue until a viable healing and resuscitation solution could be developed.”

“The Methuselah Solution?” queried Katameros.

“No, that’s a more recent solution,” replied the doctor, “that was not really contemplated by Cryonic Life or the forefathers of cryonics, like R.C.W. Ettinger or Evan Cooper. The idea of the Methuselah Solution, with life expectancies measured in the hundreds or even thousands of years, is a product of *my* generation. The wait for simple healing and resuscitation – the arcane version of the Methuselah Solution – is a product of *yours*. And the wait was longer than Cryonic Life assumed when they priced their insurance policies.”

“How much longer?”

“They thought they were being conservative when they priced for fifty years on the early policies, and they’ve been reducing that assumption in the generations since. But you know it’s been eighty-nine years for you – a lot more than the original “conservative” fifty-year assumption. They underestimated by forty or so years. Multiply that by the annual maintenance costs, and then again by the thousands upon thousands of policies they sold. I’m not exactly sure how to calculate the extra cost – I’m no actuary – but it adds up to a boatload of money. New sales of Cryonic Life policies have been funding old policy guarantees for the last decade. Even with premium increases on new policies, they’re headed for financial ruin if the maintenance for old policies can’t be terminated soon.”

“Terminated?” Adam’s uplifted eyebrow accentuated his quizzical tone.

“One of two ways – let the corpses thaw and rot,” smiled Dr. Radcliffe at her indelicate choice of words, “in which case Cryonic Life’s reputation is shot to hell and there’s no more market for new sales, or – resuscitate the old policyholders *en masse*.”

“So that’s what Father Brown meant when he said that the masses weren’t ready?”

“No, you’re a step ahead. We’re on Father Brown’s third point, the timing of the resuscitations. *En masse* resuscitation is about the frozen bodies of the last several generations, not the marching masses of today’s generation.”

“So what’s the issue about the timing of the resuscitations?”

“It’s based on greed. Cryonic Life’s greed – they need to stop paying the long-term costs of cryopreservation on all their old policies. So they were willing to help fund the shorter-term costs of our research on the nanomedical techniques that we’re using for restoration and resuscitation.”

“So Cryonic Life is motivated by greed, but it looks like a good thing they’re doing...”

“But the resuscitations are based on WCNMS’s greed, too – we’re anxious to get our Methuselah Solution to market so that we can make a fortune. If Cryonic Life knew that part of the equation, they’d have thought twice about funding our work, since their product will become somewhat obsolete to people with life expectancies of a thousand years.”

“Okay, I get it. You raised me from the dead for WCNMS’s financial gain, and your employer feels no compulsion to deal squarely with its stakeholders. So there’s nothing altruistic in what they’re doing, either...” Katameros’ voice trailed off as he paused to reflect, then continued, “And the fourth point, about the masses being asses?”

She rested a hand gently on his shoulder. “Adam, I’m afraid the masses are not ready for a single person from a century ago – let alone thousands – to be introduced into our society today.”

“What are they worried about – overpopulation?”

“I’m afraid it’s more ethereal than that,” she countered. “The current generation is as concerned with the spiritual as it is with the physical. When news of Cryonic Life’s plans for widespread resuscitations was announced, there were mass demonstrations in the streets. People with placards declaring ‘Don’t unleash the zombies!’ and ‘Cremation, not creation!’ marched on government buildings. They’re demanding that their voices be heard and that the resuscitations be stopped. And if not for the neat – some might say shady – way that the availability of cryopreserved bodies legally solved our dilemma for testing the Methuselah Solution, WCNMS would probably have yielded to the public pressure.”

“But – but why are the masses calling us *zombies*?”

The priest took over from his seated position. “It’s because they believe in the separation of body and spirit at death – that the spirit leaves the body and departs to its eternal

destination. And you represent something fearful to them: either their theology is wrong, or *you have no soul*. They have no tolerance for either.”

* * * * *

Katameros stood in stunned silence. Dr. Radcliffe dared not speak. Finally, Father Brown moved forward from his pew.

“Don’t allow the popular theology to unduly influence you, my son,” encouraged the priest, “as I said, the masses are asses.”

“I don’t think I understand...”

“The issue is one of faith. And their view of God is simply too small.”

“How so, Father?” asked Katameros.

“Let me follow the example of the Teacher and answer a question *with* a question. What *is* faith?” asked the priest. Again, there was a moment of uncomfortable silence.

Finally, Katameros offered, “I guess it’s something you choose to believe.”

“Exactly,” said Father Brown, “but the basis of that choice to believe is all-important. It needs to be a basis that recognizes that God is God and man is man.”

“So what does that have to do with me not having a soul?”

“Those who choose to believe that your soul has been separated from your consciousness, now that your consciousness has been restored to your body, have narrowed their understanding of God.”

“Really? In what way?” retorted Katameros.

“They have viewed your resuscitation as an act of *man* rather than an act of *God*. As if God has your spirit, but man was able to pry His hand off your consciousness when he – or, more accurately, she – resuscitated your body.”

“I don’t know about this *God* stuff, Father. As far as I can remember, I’ve never been a religious man.”

“Nor have I,” quipped Father Brown, “I’m instead a man of faith – faith in a God who is not limited, not even by man-made constructs like the good doctor’s ‘information-theoretic’ death.”

“What do you mean?” asked Dr. Radcliffe, rejoining the conversation. “What about information-theoretic death?”

“You posed it as a point at which recovery of the person is impossible due to the physical deterioration or destruction of the brain,” replied the priest. “My view of God is that no such boundaries exist for Him, even if the brain is completely physically destroyed. He who *created* man from the dust of the earth can surely *recover* and *restore* man from the dust of the earth.”

“I – I see your point, Father,” she replied.

“Not only physically restore man’s consciousness,” said Father Brown, “but He who breathed the breath of life into the first man can return the *spirit* to the recovered man,” said the priest as he turned from Dr. Radcliffe to Katameros.

He seemed to be assessing Adam’s demeanour for signs of a reaction. Katameros was lost in thought when the shouts from outside grew very loud and sunlight streamed into the previously dark vestibule.

* * * * *

“You two – into the confessional,” whispered the priest as he strode quickly toward the back of the sanctuary and the vestibule beyond. Katameros and Dr. Radcliffe both hesitated, not sure what the priest had in mind. Father Brown stopped at the exit from the sanctuary and turned toward the pair. “Go,” he mouthed, pointing to the confessional. Katameros and the doctor moved to the confessional and entered, one at a time, as the priest left the sanctuary and entered the vestibule.

The space inside the confessional was cramped, and the two of them crouched on the floor. The compartment was designed to be occupied by only one penitent at a time. Its walls were structured to mute the sounds from within, in order to maintain the sanctity of the confidential confession. Still, Katameros and Dr. Radcliffe could hear raised but muted voices from the direction of the vestibule.

As they waited and strained to hear, Katameros breathed a heavy sigh. “I’m not sure I’m supposed to be here,” he stated forlornly.

“You’re thinking you shouldn’t have come to the church with me?” the doctor asked.

“That’s not what I mean. I mean I’m not sure I’m supposed to be *alive*,” said Katameros, “maybe I should climb up to the top of the bell tower and throw myself off.”

“Don’t be silly,” she answered, “why would you *say* such a thing?”

“Because I was born for a different time. Because those people out there in the vestibule *hate* me, or at least what I represent. And maybe they’re right.”

“That’s crazy. You heard what Father Brown said about that.”

“Yeah, it’s pretty compelling – *if* you believe in God the way *he* does.”

“And if you don’t believe – then what does it matter whether you have a soul or not?”

“Maybe it’s just that I don’t see a purpose in living, if all I am is a computer disk that’s been restored. I don’t understand why I’m here. It must have made sense to me *before*. I had to have a reason for signing up with Cryonic Life to be brought back.”

“Maybe you were looking for a second chance to find purpose and meaning in life. Maybe you believed that it existed but knew you just hadn’t found it yet...”

Katameros was momentarily silent, again lost in thought. It suddenly became apparent from the sound of the priest’s voice that the people had now moved into the sanctuary and stood just outside the confessional.

* * * * *

“...and as I said in the vestibule, *if* there were a fugitive in here, he would have a valid claim to sanctuary anyway,” echoed Father Brown’s voice from disturbingly close range to Katameros and the doctor.

“There’s no *if* about it,” declared an angry male voice, accompanied by shouts of affirmation. “The kid here saw him come out the back of the hospital with some woman while we were marching out front. He followed them down the street and saw them come in here. He came back to get us so we could do what needs to be done – God’s work. We’re gonna send the damned zombie back where he came from. It ain’t natural. He ain’t supposed to be here.”

The priest surprised his adversaries by bursting into peals of laughter. Katameros and Dr. Radcliffe sat immobile inside the confessional, too frightened to move.

“What the hell are you laughin’ about?” shouted the leader of the vigilante crowd.

“Of *course* it’s not natural – it’s truly a *miracle*,” responded Father Brown, “so I find your statement that it’s not natural to be a humorous statement of the obvious. But your idea of what’s *supposed* to be is even *more* comical.”

Katameros sat breathless, willing himself to silence, waiting to hear the outcome of the conversation through the confessional wall.

“Come again?” said the voice.

“You’re worried about him being a man with a body but no spirit – a zombie, as you say?”

“That’s right...”

“And it’s your mission to kill him. A mission from God?”

“Exactly.”

“And so God would have those whose mission is to serve Him to kill off those who are raised from the dead?” questioned the priest.

“Right again, Einstein,” the man taunted.

“Don’t you find that just a little bit ironic?”

“I don’t get you,” the man replied.

“Never mind,” said the priest, “let me just put it this way. The thing that makes mankind unique is that God made us in His image – the *Imago Dei*. An aspect of the image of God in us is that we long for eternity, because He is eternal.”

“So what?”

“So the desire for resurrection is exactly aligned with being made in the image of God,” continued Father Brown, “and reflecting His image corresponds directly to God’s will for mankind. But you say that this isn’t *supposed* to be...”

“But the man’s spirit is *gone* – gone for eternity,” said the man’s voice, much less heatedly.

“And how do you *know* that? Why are you so *convinced*?” the priest inquired.

“It only stands to reason. Only *God* can bring people back...”

“And *didn’t* God bring this man back? Who made the doctors, and allowed them the insights needed to achieve this great miracle? Who is in the *business* of rebirth, of second chances, of regeneration???”

There was dead silence. Katameros became restless inside the confessional. Dr. Radcliffe put her finger to her lips to shush him. Finally, they heard the priest say, “Let him among you who can say with certainty that this man has no soul cast the first stone...”

* * * * *

There was a loud knock on the confessional door. Katameros gazed at Dr. Radcliffe, a look of resignation in his eyes. As the door opened, the pair saw the priest beaming down at them.

“Well, my children, that takes care of that,” he said. They peered past him and saw an empty sanctuary as they exited the confessional. “But what about *you*?” inquired the priest, looking squarely at Katameros.

“What *about* me?” he replied.

“Where do you go from here? You’ve had to face a lot today – a lot of difficult truths,” said the priest with a gentle smile and twinkling eyes.

“Difficult, yes. Truths, I’m not so sure,” replied Adam.

“You’re here for a purpose,” asserted the priest, “you’ve been raised from the dead, and you will return to the dead – whether today or a thousand years from now. But there’s a *reason* for you having that interim opportunity.”

“And what might that be?”

“You expect *me* to give you the answer? That’s something you need to work out with the one who made it possible.”

Katameros glanced toward the doctor.

“Not *her*, my son,” interjected the priest, “though perhaps she will play a role in your interim opportunity. Have you not been listening?”

“Yeah, I get it,” he replied. A smile of acknowledgment broke across his face. “God has given me a second chance.”

“And a longing for eternity,” added the priest, putting his hand on Adam’s shoulder.

Dr. Radcliffe moved to Adam’s other side and took him by the hand.

“I have something to show you two,” declared the priest.

He led the way toward the back of the sanctuary. There, in dazzling luminescence as the sun’s rays shone through, stood a massive stained-glass window. In remarkable hues of pink, purple, blue, orange, red and yellow was portrayed a striking sunrise. Inscribed below the scene were these words, identified as being from the book of Psalms, the 90th chapter:

Psalm 90: 1-6, 10, 12

Lord, You have been our dwelling place in all generations.
Before the mountains were born
Or You gave birth to the earth and the world,
Even from everlasting to everlasting, You are God.
You turn man back into dust

And say, "Return, O children of men."
For a thousand years in Your sight
Are like yesterday when it passes by,
Or as a watch in the night.
You have swept them away like a flood, they fall asleep;
In the morning they are like grass which sprouts anew.
In the morning it flourishes and sprouts anew;
Toward evening it fades and withers away...
As for the days of our life, they contain seventy years,
Or if due to strength, eighty years,
Yet their pride is but labour and sorrow;
For soon it is gone and we fly away...
So teach us to number our days,
That we may present to You a heart of wisdom.

Measurement of Mortality

By Carol Marler

The Greeks imagined fate:
Three women spinning thread.
First, Clotho spun the yarn
Lachesis then measured
Allotted spans of time.
Last, Atropos cut off.

We, as actuaries?
We do not spin nor cut,
Just measure out the length
And mark down by columns
The hours and days of life.

Are we wiser than they?
Providing for widows
And orphans, holding time
And tide, against the winds
Of Fate. Do what we may,
Each life must end at last,
And once the thread is cut
It cannot be respun.

PHUture Vision

by Carol Marler

A lot has been written about the story of PHUture Vision, and not all of it is correct. Since I was there at the beginning, I want to set the story straight on how it all came about.

Hal Johnson was, of course, the driving force. He was always the one with charisma, the one who opened doors and closed sales. He had received the designation of Charter Enterprise Risk Analyst or CERA. When he did that, he also automatically became an Associate of the Society of Actuaries (ASA). But he never showed any interest in taking any more actuarial exams.

Uri Glass is not an actuary at all. Not that there's anything wrong with that. He has a PhD in theoretical physics, and all he ever seemed to be interested in was sub-atomic particles. He especially like the peculiar quantum effects that result from "entanglement" of these particles. I asked him once about quantum computing, but he wasn't interested in any practical applications.

Me, I'm Paul Vandemann, FSA, at your service. Yes, I persevered through all those exams, but my first love remains in the area of systems development. I'm proficient in about a dozen programming languages, from ADA and APL to Visual Basic and VBA. I also do data base design.

It's never been completely clear to me how the three of us became such good friends. We hung out together in college. I am pretty sure that it was Hal who introduced me and Uri to each other. We had been in a few classes together, but never happened to make contact. Hal knew everybody. For some reason, he seemed to enjoy hanging out with Uri and me. Through all the years since graduation, we continued to get together occasionally.

So one night Hal was doodling on his cocktail napkin, rearranging our initials. PHU, he wrote, and showed it to us. I asked whether it bothered him not to be listed first and he laughed, saying something about being a link, a connector, and that the middle was the right place for that. That made sense, I guess, but I still felt a bit odd about being listed first. He looked at the napkin again, added some more and showed us the name that was to make us famous. PHUture Vision.

Uri asked, "What does that mean?" He seemed to hang on every word as Hal described something like a TV set that could be tuned to a particular client, then advanced into the future to see what problems the client needed to prepare to handle. Honestly, I wasn't impressed. It sounded to me like the plot of a bad science fiction story.

Uri, however, was not distracted by the idea of TV sets. He had an idea that his entangled particles could be used in reverse – to transform action-at-a-distance into a glimpse of futurity. You could tell how excited he was. As soon as his questions were answered, he wanted to go home to his lab and try his idea out.

Hal had an attorney friend draw up the necessary paperwork, and we formed PHU-Vision, LLC. At that point, what we had, exactly, was Uri's black box. Patent pending, courtesy of a friend of Hal's attorney friend.

The next part, though, was up to me. Instead of tuning a TV set, we needed to translate from English language descriptions into a machine readable form. There was a tricky step involving a holographic transform, to put all our data into a single, coherent pattern. After Uri's black box had digested this pattern, a reverse transform put it back into a narrative that we could use.

Yes, it was literally a black box. A four-inch cube, matte black finish. You placed it at the focus of the hologram projector and zapped it with data. Then you turned on the lasers with blank hologram recording medium.

I needed a test case. From my stash of old magazines, I pulled out the July 4, 2009 issue of *The Economist*. I scanned in the whole thing, and did a transform. I fed this to Uri's black box, then transformed back.

The result was a sort of parody of *The Economist* but dated a month into the future. Mostly it was kind of boring, but there was one ad that caught my eye. It was for a new kind of pavement sealant which incorporated color-morph technology. When the temperature was high, the pavement would be shiny white, but as it cooled, the color faded to gray, then to black. The sealant was intended for driveways, parking lots, etc. It was another weapon against global warming, by controlling how much heat was absorbed.

Then just two weeks later, I stumbled over another ad for the same thing. But this was an actual online ad, proclaiming an exciting new product. Asking around, it appeared that the product had not even been released yet when I did the test case. So I was convinced, as were Uri and Hal, that the black box really worked.

We began marketing our services as risk management consultants. Our promotional material never mentioned the black box, though. Our client list grew by word of mouth, including all sorts of businesses, such as our local electrical utility.

Hal would jokingly explain to us how his risk management presentations were structured. "I tell them that they are going to have issues if they don't make some changes. If they make the changes, I take credit. If they don't make the changes and there are troubles, I can say 'I told you so.' And somehow, the ones who don't make changes always have troubles. It's a win-win situation."

Sometimes the black box was extremely helpful. Other times its advice was as cryptic as a fortune cookie. When it said, “Change is as certain as death and taxes,” I had no idea what to make of it. Hal just decided to tell his client that two of its contingency plans needed to be updated promptly – one for dealing with tax law changes, and the other for succession planning.

Why that company had asked our advice, I really don’t know. They disregarded it, and within a year were hit with unexpected tax losses and the departure of some key officers. Hal just murmured, “I told them so.”

I suppose I shouldn’t criticize. We didn’t do much better at taking our own advice. One of our competitors approached us about licensing the black box. How they learned about it, I don’t know. Perhaps someone on their staff had read Uri’s obscure and theoretical paper in the online peer reviewed journal of subatomic particles. Maybe a search-bot had picked up on the patent application.

In any case, I was the one who had to code up the message from the competitor and run it through our black box. The result another aphorism, not even a complete sentence: “Damned if you do, damned if you don’t.”

We decided to negotiate a license. It seemed like a good way to turn our ideas into financial gain. And the work we needed to do for each use of the black box was not easy. We could let the other company do the work and we could collect the licensing fee.

And there was no reason why we couldn’t continue to do our consulting using the black box ourselves. We decided to make the licensing fee \$25,000 a month and collected 90 days worth as an initial sign-up fee. The monthly fee would be payable on the first of the next month and every month thereafter. A nice bit of spending money, even after splitting it three ways. (Not equally, of course. Hal and I were content with \$2,500 each. We thought that the black box was mostly Uri’s anyway, so he was entitled to \$20,000.)

But there was bad news all around. Uri’s paper had been challenged successfully. A university team from MIT had proved that the black box didn’t really transform distance into time. One could get the same kind of result just by doing the holographic transformation, no black box required. In other words, all that was happening was that we were rearranging the data and reporting back what we had fed in.

The response to the article was picked up by the media, although they garbled the story a bit. Anybody who used the black box was doomed to be a laughingstock. We never collected anything from our licensee after that initial startup payment.

Hal and I decided to keep on consulting, but we chose a new name for our partnership. Risk+Management. We specialize in enterprise-wide risk analysis and general management consulting. Black box or no, Hal’s presentations still went to the heart of the matter, and identified changes that our clients ought to be making. Hal sometimes

quoted an MBA professor (another old friend of his) who proclaimed, “There is no substitute for good management.”

I am surrounded by monochromatic memories that look like film noir movie posters, but are really precious artifacts from my past. In my favorite poster, Humphrey Bogart puffs on a cigarette while holding the Maltese Falcon. His contempt and disappointment are for Mary Astor, but I can't help feeling his disdain is meant for me. I feel something wet on my cheek as Lola-bot licks my face in a gentle reminder that it's time to get up and go to work in the lab. She is a bionic cat so there's no kitty litter, no odor, none of the untidiness that I miss.

My name is Patsy Ghora and I am an üma, one of the mothers at Hen House. We pronounce üma, to rhyme with new-ma, but it is really a combination of the German über and mother.

I take a quick bio cleanse in my cramped shower stall that uses very little water, and put on pink scrubs and a dab of makeup to match. There's a full-length mirror on the outside of my closet door and just enough space in the tiny sleeping area for me to back up and see my full reflection. I pose with one hand on my hip and the other hand in the air, as if waiting for Bogart to light my imaginary cigarette.

Although they are comfortable, the scrubs remind me of hospitals and death. They do nothing for my figure which has always been boyish, so I put on a four-inch wide black patent leather belt to accentuate my north from my south. Not that anyone will be looking in either direction with much interest—there are no men in Hen House. I'm of medium height with short black hair and hazel eyes that seem to look more brown or green depending on my mood. Today I think they look a little muddy. Rummaging through my prized collection of earrings, I choose a favorite pair of black onyx. If you are close enough, and a fan of old movies, you will notice they are made to resemble Maltese Falcons.

There's no chair in the sleeping area, so I lean against the closet door to buckle the straps on my sandals with the spike heels that will certainly cause foot problems in later life. They aren't allowed in the lab, so I will have them on for only a few minutes, but I can't bear wearing the ugly government-issue shoes when I am not working. After struggling with the straps, I raise my head and notice the poster on the opposite wall. In an advertisement for *Double Indemnity*, Fred MacMurray is supporting Barbara Stanwyck with one arm, his hand around her shoulder. He is holding a gun in the other hand. Stanwyck is leaning back in his embrace. Her left leg is suggestively bent so that their knees are touching. There is a slit in her yellow dress so that white flesh peeks out from the top of her knee to the insole of her foot that is covered by a red shoe. I usually find this poster to be very suggestive, but today the image makes me feel lonely and unloved. Lola-bot rubs against my leg in a ritual I programmed her to perform each morning as I walk out the door. It reminds me of the life that I used to have on earth before the Pythagoras virus.

The wall panels in the narrow corridor outside my compartment are set to daybreak with panoramas of the sun rising over the town of Ghora Gali, a mountain resort in northern Pakistan. I have never been there, but my foster parents often spoke about it. After months of walking past these images, I have an artificial memory of having lived there. Most things about my life seem artificial ever since I arrived at Hen House.

There are other ümas already at work when I walk into the lab. Our main task is to provide a monthly supply of donor eggs that are resistant to the Pythagoras virus, a horrific strain of influenza that first appears as a rash vaguely resembling right triangles. All the ümas have a natural immunity to the virus. We call the lab Hen House, but the name really doesn't fit. We never get to see our chicks.

Our emigration wasn't voluntary. Once the virus proved to be a thousand times more virulent than influenza, regulations under the Genetic Information Nondiscrimination Act were relaxed so that the CDC could identify people with a natural immunity. Congress then took action to, "preserve the future of the United States by creating a colony on the moon dedicated to the preservation of future generations of Americans." The legislation was called the Patriotic Act in an attempt to diffuse the violation of personal freedom. The ACLU and other groups tried to stage protests, but no one wanted to be among crowds where there was an increased chance of being infected.

I consider my servitude as a patriotic duty, or maybe that is what I have been conditioned to think after endless hours of indoctrination. On the other hand, I'm angry that my life has been reduced to that of a queen bee which I think is a better analogy than a hen. Or is that just a way of elevating my status from the farm to the palace? The isolation and survivor guilt are often unbearable. I talk about these ambivalent feelings with my psychologist. The counseling is mandatory. All the ümas are required to meet with a psychologist on a weekly basis. These sessions often leave me drenched in perspiration, or in tears.

To keep us occupied, the ümas do research into finding a cure for the virus. This work makes use of my mathematical background as an actuary so I am glad to help. For a few hours a day I don't think about the dead husband I left back on earth.

I am not a trained biologist, so the science is a mystery to me, but I gather we infuse modified DNA into cells that makes them behave like digital circuits. This work was pioneered by a professor at Princeton who showed that cells could be made to perform basic mathematical logic. Our objective is to find the DNA chain that will make the cells resistant to the Pythagoras virus. Even though we ümas are immune to the virus, we mostly work with mathematical models and not actual cell material.

The lab walls look like they have windows, but it's all clever technology. Today we have views of Yosemite. I remember being there as a newlywed and the incredible room with

a view of the falls. I was eating breakfast on the balcony and reading a copy of *USA Today* when I saw the article about the discovery of a tiny purple microbe that was found beneath hundreds of feet of glacial ice in Greenland. After 120,000 years of dormancy, a scientist brought it back to life. A few years later a large biotech company genetically engineered the microbe to develop what was supposed to be marketed as an anti-aging cream. In the process, they created a rogue super bug that triggered the worst pandemic in history. That company no longer exists and all the senior executives are behind bars, but the damage was done.

My lab partner is already at work when I sit down with a mug of green tea. The front of my mug is decorated with a reproduction from a poster advertising the movie, *Niagara*. Marilyn Monroe is in a red dress lying on her side atop an ice blue wall of water falling down the side of the cup. Niagara is printed in red flowing script across the falls. Above Marilyn and the falls is an image twice as big that shows a close-up of her face looking with adoration into the eyes of Richard Allan, the man she seduces into a murder plot. I have a recurring daydream in which the script changes from *Niagara* to *Pythagoras Virus* and it's my face looking into my husband's eyes.

"You freaking didn't hear a freaking word I said, did you, üma?" asks my lab partner. "Stop freaking daydreaming and help me with these freaking equations."

"Sorry üma," I tell her with more contriteness in my voice than I actually feel. Her real name is Moira, but one day she announced that her new name is Lola. I call her Mordra when I want to get her attention. She has a morbid sense of humor and a preoccupation with death. Moira likes to use the "f" word as an adjective and thinks it belongs in every sentence, at least twice. As most days, Moira is wearing dark blue scrubs that she tried to dye black. The effect is like a child who made a drawing of the sky with blue crayons and then decided to make it night. The strange color along with black lip gloss, eyeliner and nail polish make her look ghoulish. "What were you saying about the *freaking* equations?"

Moira starts over, but I can't concentrate this morning. I nod my head and make reassuring sounds, but I am not really listening. I pick up a pen and start to scribble as Moira launches into a lecture that soon becomes a soliloquy and I tune her out. Lately my doodles have taken a mathematical turn as I build a table of Pythagorean triples. The first three rows look like this:

$$3^2 + 4^2 = 5^2$$

$$5^2 + 12^2 = 13^2$$

$$7^2 + 24^2 = 25^2$$

As most students learn in geometry, a Pythagorean triple is a series of numbers so that the sum of the squares of two of the numbers equals the square of the third. Every odd number has its own Pythagorean triple as the table demonstrates for odd numbers through seven. There are lots of interesting relationships about this table, but the details seem to bore most people. Maybe that's why I became an actuary. I find some comfort in the number patterns.

There's another reason I am interested in these numbers. Some clever people have noted that Patsy Ghora can be rearranged to spell Pythagoras. That's not by accident. My foster parents were mathematicians and thought the name would inspire me. It must have worked since I was always good in math and eventually became an actuary.

Because I am obsessed with numeric patterns, I think the key to finding a cure for the Pythagoras virus must be based on a particular version of modified DNA, one that is related to a number series. There is no scientific basis for this as the researchers have told me several times. Yet I cling to this idea and often use the mathematical model to test various number patterns. I do this in my spare time, but still it irritates the head lab technician. She thinks it's a violation of the scientific method and is somehow personally affronted by the randomness of it all.

After listening to Moira for what seems like hours on end, but is really only a few minutes, the page is filled with numbers. I notice that several of the combinations include perfect squares.

$$3^2 + 4^2 = 5^2 \text{ (4 is a perfect square of 2)}$$

$$7^2 + 24^2 = 25^2 \text{ (25 is a perfect square of 5)}$$

$$17^2 + 144^2 = 145^2 \text{ (144 is a perfect square of 12)}$$

$$41^2 + 840^2 = 841^2 \text{ (841 is a perfect square of 29)}$$

$$99^2 + 4900^2 = 4901^2 \text{ (4900 is a perfect square of 70)}$$

I make a mental note to look for a pattern in all the Pythagorean triples that include a perfect square.

When the work day mercifully is over, I walk over to the medical wing. The door to Dr. Aliz Erdős's compartment is open and I stand there until she looks up and waives me in.

"Hello, Patsy, thanks for being on time; please come in and make yourself comfortable."

Dr Erdős is wearing sapphire-colored scrubs that make her blue eyes all the more piercing. She has a hematite bracelet around her left wrist, and a matching necklace. The stones reflect the overhead light when she leans over to pick up my file.

“Cute earrings—are those Maltese Falcons?” she asks, knowing I am a fan of film noir.

“Yes, they are. I like your bracelet and necklace.”

“So, Patsy, tell me what’s going on in the lab.”

“The usual, the lab work is tedious. Moira talks incessantly and drives me crazy,”

“Are you still trying to find a cure for the virus using number patterns?”

“Yes,” I say knowing that she will be disappointed. I turn my head and look at the simulated window. It’s programmed to be a sunny day in a botanical garden. Ginkgo trees are in the foreground and frame an arched wooden walkway over a narrow stream. The colors are a little too vibrant to be real, but the effect is very calming as I am sure it is meant to have that effect.

“We talked about this last time and you said you would probably stop. I’m curious why you continue.”

“I know it’s unrealistic to think I can find a cure this way. It makes no logical sense, or so I am frequently told.”

“Yet, you continue to look for an answer. What is it that makes you search for something that amounts to a wild goose chase?” Dr. Erdős leans over and looks at me with those piercing eyes. Her expression is one of intense compassion and sadness. Some days it can bring me to tears.

I don’t feel like crying today and give a churlish reply. “Whatever the reason, I see no harm in it.” We both know I am evading the question. In past sessions I have admitted that it’s a vain attempt to gain control over the virus and in some way make sense of my husband’s death and the billions of others who also died.

Dr. Erdős relaxes her features and sits back in her chair as she senses I am not being cooperative and changes the subject. “Have you made any progress on your short story?”

Several sessions ago, Dr. Erdős suggested I start to write again. She knows that I had a few stories published before coming to Hen House, before the virus, when I had a life that meant something. “Not yet, but I might to escape the boredom.”

She asks a few more questions and I give lackluster answers. The session ends and I promise to scratch out a few paragraphs before our next meeting. I walk back to my compartment. The wall panels in the corridor outside my door show an evening in Ghora Gali. People are gathered in a courtyard outside a restaurant. They are smiling and laughing. Now I do feel like crying.

Lola-bot comes to life when I open the door. I know her actions are part of the programming, but I still find it comforting. She jumps into my lap as I sit down with my laptop and access an Excel file with the Pythagorean triples based on odd numbers. I spend a half hour looking for triples that include a perfect square and determine that there are in fact an infinite number. I also determine an algorithm so that given any Pythagorean triple that includes a perfect square, I can find the next one. Tomorrow I am going to use this pattern of numbers as a key to modify the DNA strand.

I close Excel, open a word processing program, and click on the story I have been writing for several weeks. I am not sure why I have kept this a secret from Dr Erdős. I work for several hours, taking a few breaks to eat something that tastes like a paper napkin, and to relieve an aching bladder.

“Well, it’s finished, Lola-botski, Think I should send a copy to Dr. Erdős?” I open up email, attach the story, add the good doctor’s address, and hit send.”

This is what I have written.

Rogue Risk

by Patsy Ghora

I normally dress to blend in with my environment, lots of dark colors to hide curves and discourage roving eyes. But today I am celebrating and I’m dressed to incite a little fire starting with my magenta heels and ending with earrings that are twisted bits of purple and red metal that give off a fiery glow. I admit that this is a flash of conceit, but it’s a part of my personal risk profile that has been itching to reveal itself. The Senior Exec across the desk gets it. His eyebrows raise and he looks at me as if we are suddenly strangers.

He starts to ask a question when his office door opens and three men walk in. The first to enter is the chairman of the board wearing a custom made sport coat that he keeps in his office for unexpected meetings like this. The other two are dressed in off-the-rack suits that appear to be made with a fair amount of polyester. The younger-looking of the two reads the Miranda warning while the chairman confronts his protégé with alternating frowns of contempt and disappointment. I back away as if in shock, but inside I am triumphant. I will resign later today with the excuse of being traumatized by the

experience, but that's just part of my cover. There is another job waiting, more risky behavior to uncover.

You won't find my real employer in DEX or any B2B listing. To keep a low profile, we rely on word-of-mouth references among a growing network of board members. When the company was originally conceived, one of the founding partners suggested we call ourselves Rogue Risk Associates—Specialists in Human Capital Enterprise Risk Management. It was meant to be tongue-in-cheek, but the latter part seemed perfect, so the official name for tax purposes is HCERM. At internal meetings and around the juice bar we still talk about managing rogue risks. We use the word managing with arched eyebrows, some penciled in; we really mean eliminating.

Our business cards and stationery feature a logo of a black swan holding a PDA in a somewhat obscure reference to unusual events with a low probability of actually happening, but when they do, have catastrophic results. HCERM was formed to help companies avoid risks resulting from people (human capital) acting badly that can take down the entire company. In that context you can probably rattle off half a dozen companies that no longer exist because of poor human capital risk management.

My name is Sara Pothgy, the adopted daughter of mathematicians. I was eight before my parents confided that my name is an anagram for Pythagoras. It's not something I publicize, but mention it in case you happen to notice and wonder if it was deliberate. As a child I was always fearful someone would figure out the secret to my name and dreaded the humiliation that would undoubtedly follow.

My attitude about my name, and so many other things, changed after my parents died from a mysterious virus that afflicted the hotel where they were staying for a mathematics symposium. I would introduce myself as, "I'm Sara Pothgy, the proud daughter of immigrant parents who chose my name to be an anagram of Pythagoras." It generally was a good conversation starter. I also became obsessed with Pythagorean triples—series like 3, 4, 5—that we all learned in geometry. I even developed an algorithm of a sort to determine Pythagorean triples that contain a perfect square number. Boring stuff I know, but just an example to show that I am at heart a math geek. Although people always tell me I am very attractive for an actuary. There's that conceit again.

A few months later I have a new position as executive assistant to the CEO of a large multinational corporation. He suspects someone is selling company secrets and asked the Board how to proceed. The Board called in HCERM and I am back in play.

It's always a struggle to get into character the first week of a new assignment and take on the personality of efficient-but-dowdy gal Friday. It helps to wear oversized black eyeglass frames and frumpy skirt suits with just a dab of make-up. I don't want the boys

or girls paying too much attention to me and would rather appear androgynous. There's also a certain amount of guilt in deceiving people. That's why HCERM has a staff psychologist who we are required to meet with on a monthly basis. I appreciate the opportunity to talk about the job, but spend most of the time talking about my mother.

My persona is frumpy but engaging. The training has taught me how to establish relationships with people at all levels and to inspire confidence and trust. I soon have the reputation of being helpful and discreet. That really helps as I begin to gather data on the senior executives and enter it in our risk profile database.

At this point I imagine you are thinking my actions are probably unethical if not outright illegal. I can assure you that I never gain unlawful access to computer drives, plant listening devices, tape conversations or commit any other acts that would be considered breaches of the penal code. All the information I gather is completely voluntary—I am expressly directed to avoid any appearance of entrapment. Simply put, people tell me things and I observe. Talk to any servant and they will tell you the most amazing things they hear from their employers because they are viewed as inanimate objects. That's me, part of the woodwork.

The data we compile is maintained exclusively for the Board and is destroyed shortly after we deliver our report. That said, I agree that it is kind of crummy to spy on people, but don't be naïve. There are hidden cameras in most buildings and someone in IT is running programs that scan your email and monitor your internet searches. I love my job with HCERM even though I am conflicted about the ethics. It's like watching a juicy soap opera and mystery combined. My shrink says I enjoy the power and she has a long psycho-babble explanation. Whatever, it's a job and it's more exciting than other opportunities for an actuarial science major, and certainly pays a lot better than my previous positions. I just wish I could wear more stylish shoes to work.

I have a secure laptop in my apartment that I use to enter my daily observations into a standardized template. Once a week I email a file to HCERM for analysis. Our risk profile identifies certain behaviors and compares them with similar tendencies observed in a proprietary database of convicted felons of white collar crimes. We then use a sophisticated computer model to identify the high risks for further investigation. You are probably surprised to learn that a database like this exists and may be curious as to how it was developed.

The credit goes to our founder. She was employed as a psychiatrist at a low security prison and received a federal grant to research white collar crime. Her discussions with the inmates were surprisingly open. The guys—most offenders are white males over 40—were not only willing to talk, they welcomed the opportunity. They wanted to talk about their accomplishments in the business world using all the usual trite sports and

war analogies. Our founder designed a questionnaire to capture personality traits of white collar criminals and she received permission to administer it nationally as part of the grant. She spent the next three years developing a database with the intent of writing a series of articles for *The American Journal of Psychiatry* and perhaps a book.

Then she met the other founding partner of HCERM. He was an expert in risk management; he was also an inmate. Unlike most of his peers, he was generally contrite about his lack of judgment. They had long discussions about white collar crime, particularly among senior executives of which he had been one, whose bad behavior could topple a company. When he was released they stayed in touch and eventually came up with the idea of using the database to ferret out the rogue personalities (his words). She supplied the technical know-how. He supplied the business plan which he executed masterfully through the old boy network of board affiliations.

So that's a little background on why I am sitting at a desk wearing a nondescript skirt, sensible shoes and the most boring earrings imaginable. I want to scream that I have better taste in clothes than this. I settle for a cup of green tea in my favorite mug, the only personal thing I bring from home. It's a reproduction of an old poster for the movie, *Niagara*. Cup in hand, I console myself by planning a killer shopping spree when this assignment is over.

Nothing remarkable happens for several weeks. That's how it usually goes. To relieve the boredom I concentrate on extending my personal network in the company by making myself indispensable. That's not hard. Executives work long hours and travel a lot, so by staying late and being accessible on weekends I get the reputation of the go-to gal who is there when needed. As a result, I am privy to some interesting conversations and displays of temperament. After all, I am just a high paid servant. *Au contraire!* I observe their idiosyncrasies and reactions under all sorts of conditions which I capture in our risk profile: hard-nosed discussions with competitors, brusque directives to minions, flowery chats with girlfriends, strained discourse with ex-wives that often lead to angry shouting, and countless other conversations both business and personal.

Early one morning I receive a coded email; the risk profile has identified a prime target, a senior executive in the C-suite. Exultation races through my body as I shoot a fist in the air. I slip on a leotard and hit the treadmill. My work outs usually last about 45 minutes, but the adrenalin keeps me going for 60. I concentrate on a framed picture on the wall in front of the treadmill. It shows an arched bridge over a narrow stream near some gingko trees in my favorite botanic garden. That usually calms me down.

Lady Macbeth's advice, "Look like the innocent flower," pops into my head as I select another dreary outfit from my closet. *But wear a serpentine belt under it*, I add in my own twist to Lady M's steely admonition, "But be the serpent under't." Then I remember that

the duplicity eventually drove her mad. Not comforting thoughts and something to bring up at my next therapy session. The warrior in me wants bacon and eggs, but settles for yogurt and banana. I bypass the bus stop and walk the mile and a half to get back into my docile character.

My pulse is back to normal when I get to work. I barely have time to power up my computer when the CEO is at my desk. The administrative aide for one of the senior executives has taken an unexpected leave. The CEO has graciously offered my services since he is going on a tour of the company's European operations. Effective immediately I am now assigned to my target.

Our first meeting is quite revealing. My new boss is wearing a gun metal gray suit, snowy white shirt and blood red tie. He stretches his arms to hold his hands behind his head and there's a flash of light at his wrist. He's wearing gold cuff links with a Trojan shield pattern. The same pattern is embossed on the corner of a handkerchief sticking out of his suit jacket. I scan the bookshelf next to his desk and notice the *Art of War* by Lao Tzu. This guy definitely thinks of himself as a war lord. A part of me thinks this is going to be fun and I concentrate on looking bland.

As our meeting ends, he tells me to send flowers to a client for her birthday and waves me out of his office with an unlit cigar in one hand. Based on the lingering odor I suspect he lights it up in off hours when no one is around to complain that we are in a no smoking building. A dozen roses seem a bit intimate for a business relationship, so I call our investigative branch to look into it.

Over the next few weeks I gather more intelligence. Snippets of phone conversations I overhear sound like they could involve insider trading. There are meetings that do not show up on his calendar. I was right about the flowers. One of HCERM's investigators emails me some photos that won't make it into the company newsletter.

The boss decides to take a few days of R&R in the Bahamas and asks me to book a first class flight. Later that day I get on a plane for a weekend jaunt of my own. A few hours after my plane lands I am sitting at the hotel bar sipping a Scorpion, dressed to incite lots of fire, and wearing a blonde wig. My hot pink jump suit has a plunging neckline and is drawn tight at the waist with a black patent leather belt. I have a matching pink clutch purse with "What Lola wants" in black stitching across the front. Black onyx earrings in the shape of Maltese Falcons from that old Bogart movie dangle from my ears. My mother wouldn't recognize me (and if she did, she wouldn't approve). Neither does the boss who looks at me from north to south, seems to like what he sees, and then leans over to whisper something he hopes I will find amusing.

Some rogue behavior has catastrophic consequences when revealed. The media have a field day with the scandal and spook stockholders who dump their shares as the price

spirals downward to fractions of the original value. Think of that blue chip accounting firm, the energy trader, and the telecommunications company, all of which lost massive amounts of shareholder equity and in the process ravaged the retirement savings for thousands of employees who held company stock in their 401(k) plans. The board of directors want the bad behavior to stop, but not if it jeopardizes the very existence of the company. What good is that? Discretion is needed so that the situation can be managed. That's what we do at HCERM. We manage the risk.

I won't say what happened next except that the boss won't be making use of the local laws that exempt personal income, capital gains and inheritance from taxes. It's a part of the job that fits nicely with my personal risk profile. That's why I was selected for field work. I love my job, but parts of it are worrisome. I'll have a lot to talk about with my shrink and it won't be about my mother.

I file my report on Monday and spend the rest of the morning exercising, first on the treadmill, and then doing yoga on a floor mat facing a poster advertising the 1944 movie, *Double Indemnity*. I bought the poster because Barbara Stanwyck is wearing this killer yellow dress that I want to buy, but so far haven't found.

After the yoga I decide breakfast is my next priority. There's not a lot of food in the fridge. Behind a half gallon of fat free milk that is certainly a biohazard, I find a container of yogurt that is only a week past expiration, I hope it doesn't make me sick. The bread is stale but not moldy, so I toast a couple slices until they start to smoke and spread on generous layers of butter and blueberry jelly. I put everything on a tray along with a mug of green tea and carry it into my home office. My desk is a mess and I have to make room for the tray. There are reams of paper with row after row of Pythagorean triples with my notes in the margins. Someday I plan on writing a monograph on the number theory behind the patterns I have found. Part of the clutter includes a pair of gold cuff links with a Trojan shield pattern. I put them in a shoe box along with other precious artifacts of past field assignments.

I'm feeling much better and take out my laptop and pull up the short story I have been working on for months. I consider it part of my therapy and my psychologist has encouraged me to continue. It's about a young lady named Patsy Ghora who has lived through a terrible epidemic and is now working in a lab on the moon. You read the first part. I haven't decided yet how it should end.

Omega
By James A. Kenney

Actuarially speaking, I should have been dead at least 200 years ago. Give or take a few years, depending on whether you preferred static mortality tables, projected at Scale AA, or you liked to use those generational tables that were so complicated. Not that it made a lot of difference compared to a couple centuries.

After I graduated from Northwestern and finished up my Fellowship, the economy had gone into another of those tailspins that seemed to be happening more and more frequently as money became concentrated in the hands of fewer and fewer people. Not that I mind, of course, since after 300 years, most of it has become concentrated into one pair of hands: mine, due to the twin miracles of compound interest and extraordinary longevity.

The only job offer I got was from the U.N., to gather demography data in Turkey, of all places. They sent me to the most remote location I could imagine, tucked somewhere under the Black Sea (which really was black by that time, due to pollution), where I settled in a tiny town called Ina Qurinya. Don't bother looking for it on a map: I have made sure that no records of that town still exist.

One thing I noticed right away was the number of old men playing backgammon and sipping tea in front of the café in the main plaza. They were all wrinkled and weathered and looked older than Methuselah, though I figured they were probably in their mid-fifties, life being what it was in rural Turkey. I used to consider myself a killer backgammon player (part of my training at Northwestern) but these old men whipped my butt without even thinking twice about tricky situations, and they would throw the Cube at me when I least expected it. After a week of losing more than I was being paid (the U.N. wasn't exactly the most generous of patrons), I decided to leave the 'gammon to the old folks and get on with what I was being paid to do.

It wasn't easy, I can tell you that. Nobody wanted to talk about how old they were, when they were born, their family relationships or any of the stuff that makes demographers sit up and drool. I had thought at first that being a demographer sounded cool (I was one of the few members of my graduating class who had a job), but anyone who has ever spent more than a few hours with one would prefer a hot summer afternoon in Hell to repeating the experience. Everyone in the village seemed to realize how lame I was, and after a couple of months, acted like I wasn't

there. I made up data, using the modified version of Makeham's law which was in vogue at the actuarial department of Northwestern, the one which incorporated genetic abnormalities, and sent it in to my superiors via uplink, before the satellite network was trashed by the spectacular sunspots of 2021. Meanwhile, I sat in the plaza and sipped the same tea the old men were drinking, and watched them play backgammon, trying to learn a few new tricks. Those men were good!

Gradually, I began to pick up some strange tidbits laced into their desultory conversations. One man alluded to the Ottoman Empire's obsession with different hats for different occupations. A week later, someone mentioned fighting the Armenians, and lamented the lack of shoes then. Meanwhile, my beard thinned and almost disappeared. My hair turned lighter, going back to the blond color it had been in my teens. I felt restless and began to crave excitement, action, anything out of the ordinary, which in Ina Qurinya was absurd: nothing out of the ordinary had happened there since World War I.

Once a month a functionary from the provincial capital would come through and collect taxes, selling cigarettes as a side line. The way those villagers smoked, you'd think none of them had ever heard of the Surgeon General's warnings, even though the packets were covered with vivid illustrations of ruined lungs, as part of the world-wide campaign to eliminate smoking. This visit was practically the only contact the villagers had with the outside world. I doubted if they had ever met anyone from America besides me, or even any foreigner.

I guess the first thing I noticed that led me to wonder what I had stumbled across, was the fact that after an entire year in Ina Qurinya, there hadn't been a single funeral. You probably know that among Muslims, funerals are a big deal. The whole town would have turned out, wailing and keening, lifting their arms as if beseeching Allah to undo the terrible deed, winding their way to the cemetery where the body would be interred, head facing Mecca, within a day following death. Yet I never saw a single procession, nor did a single one of those old men slip into the dark night, never to play backgammon again.

I took to wandering through the cemetery, but there were no dates on any of the stones there, and the townspeople chased me away whenever they saw me disturbing the sleep of millennia. What I noticed is that there were fewer memorial stones than I would have expected, given the apparent average age of the villagers. One day, one of the old men mentioned Sultan Abdulmecid and how his reforms had abolished taxes, and the other men laughed. That night I googled

Abdulmecid (the satellites were still working then, although their demise was only a few days away) and discovered he had ruled in the mid 1800's.

How old were these people?!

Then the Big Sunspot came, and I forgot all about Abdulmecid. It was no laughing matter, since the radiation tore through the Van Allen belt as if it weren't even there, and world-wide mortality spiked. I was sick for a month, and the villagers took turns taking care of me, wiping my face after I threw up, and giving me tea, tea and more tea. Why they bothered with a pasty-faced takfir, I don't know, but they were a tender hearted people and I lived.

It was almost a year before the functionary came from the capital to collect taxes. It wasn't the same man, and he didn't bring any cigarettes, but he did bring news: news of the Great Catastrophe, or as the villagers called it, Allah's Retribution. The radiation had wiped out most Western communication systems, destroying centuries of building in a matter of hours. A new Dark Ages had settled over Europe, and Allah be praised, Turkey had regained a position of prominence such as it had never known since it lost the Battle of Vienna in 1683.

Despite the tremendous mortality elsewhere, only one of the villagers died, an old man who was mourned extravagantly while I lay waiting to die and drinking the omnipresent tea that grew only in Ina Qurinya. When I recovered, it didn't take me long to realize that something extraordinary had happened, and it wasn't the Big Sunspot.

In the 300 years since then, I have become the richest man in the world, if not the oldest. The tea of Ina Qurinya has kept the dark shadow of death far from my door, while compound interest and a lively grasp of the profit potential that followed the Great Catastrophe has done the rest. I have kept the secret of the tea, and no one even knows the village exists, except the men older even than I am, still playing backgammon in its sunny streets and sipping their tea...

Let's Test the Airplane before Selling Tickets

by Dick Joss

Background

Aristotle is widely regarded as having one of the best minds of all time. Yet he was the author of a theory that if Object A was twice as heavy as Object B, that Object A would fall twice as fast. Just imagine what should have happened if a 20 pound stone and a one pound stone were tossed out of a second story window. Yet it took nearly 2,000 years before another great scientist – Galileo – actually tested this theory by dropping a couple of objects from the Leaning Tower of Pisa. Some times the great minds just plain get it wrong, but because of their greatness, the theory goes on and on and on.

As a second example, consider the case of Nicholas Copernicus (1473-1543). Instead of heeding Copernicus' theory that Earth and other planets revolved around the sun, the leading scientists of that age spent years devising complicated formulas to explain how the planets would travel in curiously reversing orbits. It took more than 100 years for Copernicus' ideas to be fully accepted by the scientific community.

With 20/20 hindsight regarding Aristotle's classic flop and the problems faced by Copernicus one would think that the great minds would be extra cautious to make sure that they get it right the first time – that newly created theories would be rigorously tested before being foisted upon the public. Or at the very least the faulty theories would be corrected as soon as the flaws are exposed. Unfortunately, this futuristic idea is right up there with personal jet packs for getting around. After all, this is an article of speculative fiction!

Modern Academic Finance

Fast forward to the development of modern academic finance with its numerous Nobel Prize winners. Their theories launched the age of the financial "Quants" with magical formulas. Never mind that battle tested veterans such as Warren Buffett offered: "Beware of Geeks bearing formulas!" The damage from not getting it right litters the financial landscape. Long-Term Capital Management. Kaboom! Bear Stearns. Kazaam! Lehman Brothers. Kerplunk! So much for 20/20 hindsight and getting it right the first time.

In reality, much of modern academic finance is just as flawed as Aristotle's Theory of Falling Bodies or the scientific theory that Earth is the center of the solar system. Consider this simple piece of conventional modern academic finance wisdom: The arithmetic mean of historical investment returns is the best estimate for next year's result. The truth is that "the" arithmetic mean doesn't exist. Nobel Prizes have been awarded for a number that is complete fiction, as is easily shown in the example below.

Consider an investment of \$1,000 on February 17, 2003 which grows to \$1,378 by August 17, 2008. The geometric mean return for this investment, which describes the actual rate of growth in terms of how much money is made, is easily determined to be

6.0% per year. Thus, with this investment you would wind up with the same ending wealth as if you had been invested in a 6.0% certificate of deposit for the 5.5 year period. But instead of using this 6.0% return as a “best estimate” of expected return for the future, leading academics say that the arithmetic mean return is the best estimate.

Arithmetic Mean Calculations

The first thing to notice is that calculating an arithmetic mean is a difficult challenge. If you have only the beginning investment value, in this case the \$1,000, and only the ending value, in this case \$1,378, you cannot calculate any arithmetic mean. Without intermediate observations of how the investment changes over time it is absolutely impossible to calculate an arithmetic mean. But even with lots of intermediate information, the calculation of an arithmetic mean is anything but a slam dunk.

Continuing the illustration, more information is presented in Table 1.

Table 1
Sample Investment

<u>Date</u>	<u>Fund Value</u>	<u>Date</u>	<u>Fund Value</u>	<u>Date</u>	<u>Fund Value</u>
2/17/03	\$1,000.00	2/17/05	\$1,123.60	2/17/07	\$1,262.48
8/17/03	1,122.73	8/17/05	689.00	8/17/07	689.00
2/17/04	1,060.00	2/17/06	1,191.02	2/17/08	1,338.23
8/17/04	1,378.00	8/17/06	1,378.00	8/17/08	1,378.00

In order to calculate an annual arithmetic mean it is reasonable to select annual periods of observation. For example, you might select the period from February 17 of one year to February 17 of the next. This calculation is presented in Table 2 as follows:

Table 2
First Calculation of Arithmetic Mean

Date	Value at Date	Value 1 Year Later	Rate of Return
2/17/03	\$1,000.00	\$1,060.00	6.0%
2/17/04	1,060.00	1,123.60	6.0
2/17/05	1,123.60	1,191.02	6.0
2/17/06	1,191.02	1,262.48	6.0
2/17/07	1,262.48	1,338.23	6.0
2/17/08	1,338.23	N/A	N/A
8/17/08	1,378.00		

Arithmetic Mean Rate of Return (Average of Last Column): 6.0%

For the short 6-month period from February 17, 2008, to August 17, 2008, the investment grew from \$1,338.23 to \$1,378.00. This change in value is about 3.0% which is consistent with the arithmetic mean from the above spreadsheet, given that short period

was exactly one half of a year. You could reasonably conclude that the investment had an arithmetic mean return of 6.0%.

As a second method of calculating the arithmetic mean, you might select years running from August 17 of one year to August 17 of the next. This calculation is shown in Table 3 as follows:

Table 3
Second Calculation of Arithmetic Mean

Date	Value at Date	Value 1 Year Later	Rate of Return
2/17/03	\$1,000.00	N/A	N/A
8/17/03	1,122.73	\$1,378.00	22.7%
8/17/04	1,378.00	689.00	-50.0
8/17/05	689.00	1,378.00	100.0
8/17/06	1,378.00	689.00	-50.0
8/17/07	689.00	1,378.00	100.0
8/17/08	1,378.00		

Arithmetic Mean Rate of Return (Average of Last Column): 24.5%

In this case you notice that for the short six-month period from February 17, 2003, to August 17, 2003, the investment grew from \$1,000.00 to \$1,122.73. This change in value is about 12.27% which is consistent with the arithmetic mean from the above spread sheet, given that the short period was exactly one half of a year. You could reasonably conclude that the investment had an arithmetic mean of 24.5%.

Both of the above spreadsheets are correct, but the resulting difference in the answers is huge: 6.0% vs. 24.5%. Taking the annual arithmetic mean of historical data by only looking at a snapshot of the data once every 12 months produces a wide variety of answers. In fact, by selecting an appropriate fiscal year you could have produced any arithmetic mean you might want between 6.0% and 24.5%. Nobel Prizes notwithstanding, the arithmetic mean theory has no substance.

Summary

When Boeing makes a new airplane, it is rigorously tested before the flying public is ever put at risk. This has not been the case with academic finance, and the catastrophe witnessed so far will only continue until a much higher level of testing rigor is introduced into the development of new financial products or theories. Those who are particularly hurting are the 401(k) investors. They have been lead to believe that they would earn an arithmetic mean rate of return, and are sorely disappointed by the actual geometric mean results. While one might hope that this problem will be corrected soon, keep in mind one last time that this essay is one of speculative fiction.

Haiku Story by "David Johnson"

Jonny was sitting.

He was an actuary.

Jonny was working.

Jonny was driving.

Jonny went to the food store.

Jonny bought some food.

Jonny determined

The food risk versus food cost

Jonny used some math.

Jonny determined

The food risk versus food flavor

Jonny used some math.

Jonny stayed up and

correlated life and food

Jonny determined

Jonny found something

The secret of a long life!

Jonny found something

Jonny won a prize

The Nobel Peace Prize winner!

Jonny won a prize

Jonny died early

Reason was his equation

Jonny died early

Price it Like A Life Product

By Nick Jacobi

When the world economy finally shook itself out, when anyone in India, China, or Tajikistan could work as an American actuary, when it became widely known that Social Security was a form of welfare and was cancelled, forcing everyone to buy true insurance, the American actuaries were reduced to doing the only three things that they can do comparatively better than the rest of the world.

- Research
- Computer programming
- High-speed coffee making

Dave knew all this when he took the job at the biggest most powerful insurance company on earth, Ultra International Group (UIG). He not only took the job, he survived “The Program.” You could only get in “The Program” by acing all the college actuarial classes you would need to pass the ten SOA exams necessary for Fellowship. Then, once accepted they give you no time to study and fired you if you failed any exam twice. Then, once you were done you had to take the IAA exam and prove that you could operate not just in your own but in the world accounting system, only once you passed and got your FIAA were you considered a fully fledged actuary.

And when he made it through he was no mere Fellow of the world, he became David G Pilgrim, the Actuarianator. No, he wasn't the Chief Actuary of the company, but sort of the Chief Operating Actuary. His job was to do all the dirty, messy, cumbersome, tiresome, bulky, ponderous, oppressive, non-thirty-thousand-foot-high-level projects that had to be done to keep the company together.

It was he who had performed the C3P9 simulation in bulk for the annuities unit, a project requiring him to run nested simulations that were five levels deep and generate several billion records in Access, the results of which had to be summarized in no more than three slides for the Chief to show to the VP, to show to the EVP, to show to the C level, and by the time it reached that level it was only one half of a slide long. That particular project was a tough one, but he succeeded by becoming his own IT department. Seeing that the budget for computers and hardware was nonexistent, the Actuarianator had to think on his feet. Every computer these days could be wired up to any other, all he had to do was get four old computers, read a few motherboard user manuals and he was able to put all the processors in parallel. Homemade supercomputer in hand, Dave finished ahead of schedule, earning unprecedented renown and a slight salary increase.

The Actuarianator had no staff, and needed none. Like a modern foot soldier he was expected to be a leader on his own, and in the same way that a modern soldier carries more firepower on his person than an ancient battalion did pre-World War I, Dave possessed a wealth of computer and knowledge assets that would put the actuaries of old to shame.

After that the Actuarianator revised the LTC reserving process from a work of fiction into hard fact. It was simple really, instead of trying to project the economy thirty years into the future when the claims would come due he broke the policies down into a series of one-year put option sales on a replicating portfolio. Although no put options were available in the durations needed, he was able to use the prices on available options to calibrate long durations using a variety of models. Black-Scholes gave him some good results, and when he crossed those with solutions for the Whaley quadratic and Barone-Adesi models he arrived at what he felt was a more accurate representation of the pure claims. He ran a few expense studies to determine what margin to add for profit and expenses and UIG had a well priced product.

Then he did something similar for the new MIRA product, a pre-paid retirement healthcare product. At the time it was groundbreaking, the product allowed customers to pre-pay for the medical supplement insurance plan they would need when they retired. Because of a favorable interpretation in the tax code, the contributions to this plan were allowed to be made on a pre-tax basis, and with a guaranteed interest rate of three percent it operated as a kind of IRA.

Now the Actuarianator had been put on his most challenging project to date, the creation of UIG's new Life ETF market. Will the Chief Actuary, and Dave's boss, came sauntering into his office one day, though to be fair it was less of an office and more like a series of cubicles that the company taped together for him. "Dave, I've got something for you, something big!" This was the usual prelude he got whenever he was asked to do something unpleasant. "Yessir, what might that be?" Will handed him a dossier-size stack of papers wrapped in a file that was partially surrounded in rubber bands. "It's the ANGLE ETF." "Wait, what's an ANGLE?" replied Dave. "UIG's New Guaranteed Life Expectancy. Exchange Traded Fund," Will said. "Ah, um, okay." This sounded like the MIRA product, someone in a high executive position spit-balling various fantasies at the actuarial division in hopes of co-opting any brilliant ideas that might echo back. "It's the idea that we can sell life insurance in the tiniest of bite-sized units, the market for life is so huge that there's no reason it can't be sold over a kind of stock exchange. As long as we put a few rules in place and controls, that is." The Actuarianator was intrigued, "Interesting," he said. "Will, you do know that mankind has been putting 'a few rules and controls' in place for the security markets ever since someone wrote the Ten Commandments, right?" "Yeah yeah," Will responded, "but actuaries were never allowed to run those markets, and if we were involved they would have been called 'the three commandments.' This will be different." It did sound different to Dave but he found it weird that he didn't hear of it sooner. Usually when new products were manufactured he was brought in the loop early, trying to get his opinion of success. "If I were in charge of this place," Will once said, "one of my senior vice presidents would be an average three year old child. Any problems he can spot with my initiatives would be corrected before implementation. You, Mr. Pilgrim, are my equivalent to said child." That was about as high praise as he could get out of Will. "And," Will continued, "as long as UIG is the one making the market for this sort of thing first we think it can be something special for us. Really a game-changer in the whole concept of insurance."

"It sounds neat," Dave said, "So what do you need from me?" As if Dave didn't already know he would be tapped as the creator for this random brain discharge. "Same as always, go through everything, all the details, and recommend a way to make this happen." "Okay, and, by what date?" "We'd like to bring you into the discussion by the end of the month." Red flags

immediately went up in the Actuarianator's mind, when they said 'end of the month' that typically meant 'end of the year' but he had to play this highly ritualized symbolic game in order to avoid agreeing to the usual madness. "Gee, Will I'd have to see how it goes, in order to do a quality job I think I would need more time." Will smirked, "I see, officially how much more do you think you'd need?" Here the Actuarianator made a slight mistake and mentioned an actual length of time, the first person to mention time in these meaningless negotiations usually lost. "About two quarters maybe." Now Will increased his smirk amplitude, or smirkitude as Dave called it. "I tell you what, get back to me with your initial thoughts by next week and we can sharpen the pencil in terms of due dates, perhaps I can help speed things up." One quarter, the Actuarianator knew, that's all he was going to get now, as 'speeding things up' always meant that it had to be done in half the time. He knew it would have to be something done in time for the next reporting cycle, damn the SEC, he thought, they won't be happy until they force us into releasing our financials daily and fill half the company with accountants and lawyers. Leafing through the tome he had been given he saw scraps of emails, things written on the back of other things, some things scribbled over fully formed and written pages, the usual mess. It would of course be dangerous to promise anything, he knew this, and yet the constant exposure to dangers throughout his career had bred a sense of contempt for them. "End of next week, sure, I'll think up some details." "Great!" Will said, "I'll send you our next big meeting invite, we'll go over your slides the day before." And that was it, the project of a lifetime almost fell on him like an I-beam, he was going to need some serious coffee for this.

"Hey Professor?" That was Mike, from the cube next door. "Yes Doctor, guess you overheard?" "Yup, sounds like a bear." Mike usually played the master of the obvious role around the office but was nonetheless worthy of the Actuarianator's respect. "Don't worry Mike, I'll make sure it goes off without a hitch, that way we can still afford to pay paperweights such as you." "Sure I'm dead weight, but someone's got to keep you're inflated head from taking off into orbit," was the response. "Touché. Perhaps you'd be interested in hitting the coffee with me, a little celebration of my new and glorious burden," replied Dave. They headed down to the lobby, the good thing about Mike is that he was the only other person who would drink a cup of ultra-caff at three in the afternoon with him. For the remainder of the day the Actuarianator went through his emails and his work-a-day items, all the while letting the germ of an idea for the new product work its way into the hidden corners of his mind. He found it best to start projects like these by eliminating all distractions and taking a day to sleep on it.

Dave's excitement abounded by days end but began to ebb away on the ride home, when night dragged him into darkness and solitude he began to feel more uneasy. In this day and age governments no longer had a solid monopoly on violence, global companies were powerful enough to have their own cross-political armies, though they still gave the world governments a fig leaf and called them "lobbyists." Big companies like his were indeed a breed apart: too small to be a country but too large to be an insane asylum they were something else entirely. Internally UIG's lobbyist arm was called simply "The Counterparty." They tended to hang around the big big projects, perhaps waiting to get rid of any loose ends. The Actuarianator knew he was good but also that he wasn't the first to hold that title, eventually he fell into a more or less dreamless sleep.

Fortunately all dower thoughts had left him as the first tinge of light penetrated his eyes the next morning. Dave woke up much cheered and celebrated his new assignment by making

scrambled eggs, and even had a small cup of coffee. "Bleg," he said choking it down. The coffee at work was like sugared jet fuel delivered directly to your face, this tasted like burnt beans out of an ashtray in comparison. He tidied up, put on his third most professional outfit and drove up to work, eager to review his initial files on the project. Upon arrival he walked up to the door and pressed his finger up on the bioread board, the cold glass gave him a freezing welcome and unlocked the door. He was quick to stop at the coffee machine in the lobby, pressed the "twenty ounce double-hot hazelnut soy-cream double-sugar" combination and in two-point-five seconds the coffee door opened and delivered unto him a boiling cup that steamed in his hands and mirrored his increasing energy for the assignment.

Elbowing his way to the elevator, he punched in his floor and went directly to his conglom-cube to begin wading through the information in the project folder. His heart moved slowly up through his throat as he looked through the project folder Will gave him. Here was a beautiful half-crumpled envelope addressed to James Nitter, one of the executives. Apparently Jim wrote all over the back of it in an attempt to balance his checkbook, and on top of that he wrote "ETFs can make life insurance easy" in all caps with triple exclamation points. Truly this was a powerful mandate indeed. Another illuminating document was an email from Jill Schoeder, another high-powered exec, to Will in which she uses the words "ETF" and "Life" almost as extensively as she uses the words "you do it" and "synergy." Another gem was a note from Will that was apparently written on a napkin, everyone knows the first criteria for a brilliant idea is that it must be written on something flimsy and in broken English, it said "price it like a life product." The executives could never open their mouths near him without subtracting from the sum of his knowledge. "Shikes," Dave said nearly under his breath, there was nothing there, at least nothing that could point him in any kind of direction. He was aware that it would be messy, but everything here was just a retelling of an inherently crazy idea: sell life insurance over the Internet, on demand, in an ETF form.

"Ok," he thought to himself, putting aside the supposed project folder. "How would this product really look?" The first step would be creating a system like the NASDAQ that could allow high speed trades in these securities online. He decided to assume that was possible since it had already been done. Since UIG was thinking about doing this it was also safe to assume that they would be the market maker and would thus be the one offering the first securities. These securities would have to be simple for the purpose of understanding at a general level and for ease of pricing. Maybe they would read something like "UIG offers 1,000 units of ten year term male age 55 100K face value guaranteed at 3% for an ask of \$15.5." This was starting to sound interesting to him now, it might show up in the Journal as 1,000 10T100KUIG55M3 ask=\$15.5, in fact there could be a different market for each insurance type and guaranteed rate, leaving just a 55M \$15.5 symbol on a ticker. Plus the guaranteed interest rate would cause the security to act as a derivative on UIG's general account, investors loved that sort of thing.

Whoever owned the certificate on the stock would be the insured and would select a beneficiary to receive the benefit upon death. UIG could also charge a commission on every trade that would add to the margin. Plus, this would form a secondary market in which the insureds could trade. A market is, as far as he understood it, just a big auction. If two thousand people want the UIG55M product but there are only one thousand in circulation each bidder will keep upping their bid until the price reaches a point in which only one thousand bidders would

be left, raising the price and making the trade possible. Thus a systematic antiselection would show up in the price movements on the secondary market, allowing UIG to reprice new issues on the fly and ensure commission adequacy. So this up front commission charge would be the COI and margin in a competitive environment, and it could be done taking into account the expected frequency in which the policies would change hands. Lapses would have a very minor effect since the secondary market would allow for sale of contract immediately charging a commission and not a penalty. Perhaps each year the securities would change, UIGM55 would become UIGM56 one year hence. If the market was large enough it wouldn't matter to the company who actually held what contract, as long as the holder was a fifty-five year old male or whatever.

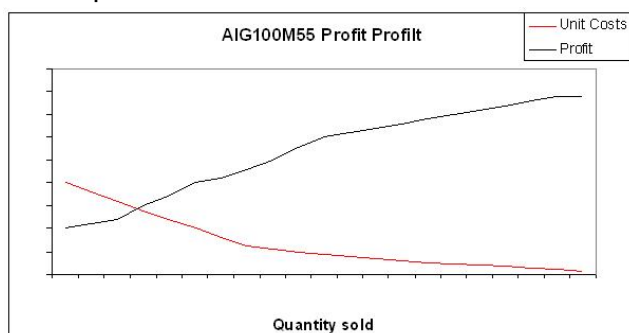
And now for the pricing. Getting the correct sale price was key, the bid-ask spread and future pricing on the secondary market would be handled by market forces. What he needed was a way to simulate a potential future in a market that did not yet exist, fortunately he had a chaos engine in his homemade computermajig. Reaching under his desk he turned on the monster, it consisted of four motherboards wired end to end in a kind of open cube that was then poorly wrapped in a metal casing, or rather duct-taped with parts of a metal casing, with another four internal fans in it and a big external hard disk hooked up to board one. All this glory was connected through board one's video card to his pathetic eighteen inch monitor. He continued to sip his coffee (still hot) and twenty minutes later it finished booting up. Opening up his C# builder he found the chaos engine project quickly.

The theory behind it was simple, the world and everything modeled in it is chaotic, but the nature of this chaos depends on the parameters inherent in the system, and depending on those parameters there are often windows of order in any system. For example, the weather is a complex system, but if you could change one of the parameters it would be much easier to predict, say if you could make the wind blow only in one direction. In the same way the chaos engine could be instantiated for the pricing model and parameters can then be set up that would simulate the ETF market. You'd get something chaotic but you can change your parameters until some kind of order appears, perhaps changing the number of shares issued, commission percentage, and so on. He would price the product at the boundary condition for each parameter that UIG could control, this was the point where the order that makes prediction possible would get absorbed into the chaos of the system if the parameter changes any more. As simple as this was it took a lot of processing power to make it work, that's where the Actuarianator came in, he would run it overnight and over-weekend after he set up the programming, all while writing up the basics of his report.

It was some of the most exacting work he had done, he had a list of over ten thousand parameters when it was all over, about one thousand of which had a high degree of sensitivity. These could not all be desensitized in the model when the chaos engine ran, "fading them out" was what he called it, many had to be business decisions and many were reviewed with Will. "What makes you think the security turnover rate will be this high?" Will would ask. "Well this is based on studies of our inforce term block weighted with the turnover rates from a portfolio that we think replicates this mortality exposure." "How did you do the weighting?" "Bayesian style." "And the margin in the product?" "I'd recommend putting some into the actual price because of the pseudo-market risk we're taking and not keep it all in the investment spread." And each day new questions piled up, strange new directions were constantly being added. "Could this be

used as a COLI/BOLI product?" "I suppose we could allow a company to designate the beneficiary and insured life as long as they conformed to their best practices." They decided that might create more serious institutional investors that would drive prices in an unfair way for the folks buying individually and that if anything the COLI/BOLI stuff would be a future ETF in an isolated market. It went on for several weeks before they both got a handle on the product. One day Dave walked in to find a man in a short button-down shirt with silver sunglasses talking to Will, when he came back later Will seemed pretty up front with him. "Yes, that fellow was from The Counterparty. With corporate preparing for a launch they are having them check on our progress from time to time, just to keep us honest." This inspired little confidence but Dave decided to try to ignore them. After another month he had what looked like a pretty good model upon review. Upon further review the damned thing was consistently crashing and had to be debugged after almost every run. That went on for a week before his full confidence in the model was finally achieved, and when he ran the engine for another week he was satisfied, it would be a profitable product.

The Actuarianator began writing it all up. Here was the difficult part of the job, he had done all the technical mish-mash to make it work but that was only one half of the job, now he had to explain himself while doing his best to hide the fact that he was literally making up the words as he went. "The UIG ANGLE ETF," a great title, and with that he started with the executive summary. He had about thirty charts and graphs that he wanted to put into the document but pared it down to one simulation result for the summary.



- Margins would be in the four to six percent range in a mature market, though losses would occur in small markets
- There were economies of scale that drove the cost of production curve lower as more units were sold, more buyers meant a larger secondary market
- Pricing could effectively be changed on the fly, the product would quickly provide a credible data set for any predictive modeling

The rest of his report pretty much wrote itself and was full of the technical details behind the pricing and implementation as well as the rules of the market itself. To the average customer it was as simple as setting up an individual profile: name, birthday, SSN, etc and paying a moderate entry fee of about twenty dollars. The system would use that entry fee to do some background checking on the individual. Once verified the customer could go through all the screens in the market and buy shares for their age/gender for any product, share level and interest rate available, each share might represent one hundred thousand in face value for a term or whole life product. They could even buy universal life products and select their

secondary investments, making the life contract a second-level derivative. The initial purchase price was set through the pricing module based on the size and experience of the pool, the units bought would then move into the secondary market and their price would vary with supply and demand, any subsequent trading of those units would then be subject to a commission charge of about ten dollars per trade. It was certainly a new concept but it was real insurance that could be easily bought, transferred, and monitored but could still be understood by anyone with or without experience in market transactions.

Soon he found himself back in Will's office with the recommendation. Will sent him back with questions, Dave answered them, leading to more questions, a second week-long run ensued to answer it all and with that the Chief Actuary approved with some enthusiasm. Things happened quickly from there, the recommendation went up the line encountering little further resistance until finally Dave was at the big show - sitting in the product's kickoff meeting with the heads of sales and the company in general listening to Will go through his ideas. "We are going to change the life insurance market forever!" was the opening line. And with that Will laid it all out for them, the product features, market setup, pricing, implementation, and finally the accounting treatment. Will was not only dull, he was the cause of much dullness in others. Almost complete agreement followed and there was some discussion on the implementation schedule that was mainly a setup to extract promises of progress in time to tell the major stockholders.

The Actuarianator was mentioned with honor as someone who worked on the project, of course all the credit went to the fellow who gave them the envelope with several layers of writing on it, one of which exclaimed "ETFs CAN MAKE LIFE INSURANCE EASY!!!" After all it was that guy's idea. As everything wound down Dave was able to wake himself up and conferred again with Will. "Great job Dave, as always," Will said. "Thanks I appreciate the opportunity, couldn't have done it without..." the door to the meeting room opened suddenly, inside walked a man wearing jeans, a short sleeved button down shirt and silver shielded sunglasses. Behind him came another man in similar dress. Then another, another, and then four more. "Uh, yeah thanks for the help," Will broke in "Yup again Dave great job - now I've got to go see to it that we get started thinking on this implementation in secret, you understand, in the meantime some men from The Counterparty here would like to talk to you for a few minutes, cheers!" As he closed the door the Actuarianator swallowed hard, wishing he had a cup of coffee.

~Nick Jacobi, FSA CERA

The Curious Story of Mr. James Phillimore *by Walt Herrington*

I first met Mr. Sherlock Holmes in connection with the curious story of Mr. James Phillimore, who, stepping back into his own house to get his umbrella, was never more seen in this world – or so Dr. Watson stated years later. However, Dr. Watson was merely disguising the true ending of the tale, which I here lay before you now. My secret work on the difference engine has long been declassified. All the principals are now passed on, and it can do no one any harm to set the true facts before the public. Nor can it possibly damage Mr. Holmes' reputation – indeed, I think it rather enhances it.

That bright May morning in the year 1886, I was looking over my plans for modifying Mr. Babbage's Difference Engine when I heard a knock on my office door. I quickly gathered my plans and locked them in my desk. When I opened the door I saw Mr. Franklin Blake, the company solicitor. "Mr. Spenser," he said, "it is time for us to leave for our appointment with Mr. Holmes. Do you have the file?"

"Of course, Mr. Blake," I answered. I placed the Phillimore papers into my documents case and accompanied him to the carriage awaiting us. Mr. Blake instructed the driver to take us to 221B Baker Street, and we sat in silence as the carriage rattled through the busy streets of the greatest city in the world. A few minutes later we climbed the 17 steps to Mr. Holmes' consulting room and were announced by the Scots landlady.

"Come in, come in, gentleman," cried a tall spare young gentleman. "I am Mr. Sherlock Holmes, and this is my associate, Dr. John Watson. Pray be seated." And he suited his words with his actions, sprawling in a chair and steepling his fingers.

Mr. Blake introduced us, and was disconcerted when Holmes remarked, "A solicitor, surely." "Why yes," he answered, "but how did you know? Have we met?"

"I have not had that pleasure," replied Holmes smiling, "but the day I cannot tell that a man is a solicitor is the day I retire, although I admit that when I was younger I once confused a solicitor with a barrister." He turned his sharp grey eyes on me and remarked, "I am more intrigued by your colleague, who is obviously not a solicitor. Beyond the facts that he is originally from New York, works in an office, writes a good deal, and commands a large staff and a large income I cannot say. I would have said accountant but for the fact that the writing is done chiefly in pencil."

"And I," I replied, "know little of you, Mr. Holmes, beyond the facts that you smoke a great deal, have engaged in fisticuffs recently, experiment with chemicals, some deadly, and occasionally use cocaine."

Blake and Watson stared at me, but Holmes merely chuckled. "A distinct touch, I confess. But your profession?"

"I am an actuary."

"Ah, yes. You are the first of that profession that I have met. How can I assist you?"

Blake asked Mr. Holmes if he were familiar with the case of James Phillimore. "Phillimore? Hmm.. Not a homicide case, surely."

“That, Mr. Holmes, is what we were hoping you would tell us.”

“What do the police say? And what is your interest in the case?”

Mr. Blake looked at me, and I spoke up. “The police, Mr. Holmes, are convinced that this is a missing person case, since there is no evidence of homicide or suicide. We represent the Empire Life Assurance Company, and Mr. Phillimore was insured by our company in the amount of ten thousand pounds.”

Mr. Holmes raised his eyebrows at the amount involved, and Dr. Watson whistled. “A very pretty sum,” Watson remarked.

“Indeed. Murders have been done for much less. Perhaps, Mr. Spenser, you and Mr. Blake would be kind enough to give us the particulars of the case.”

“Certainly. Mr. Phillimore was a Dorsetshire man who had come to the city in his youth. He joined the offices of Cox and Swain, Importers, Ltd. He was very successful, and within ten years rose to direct their London office. His personal life was, however, not as notable as his professional life. He had a reputation for high living and on occasion mixed with a rather disreputable crowd. It was surprising that four years ago he married the Honorable Miss Beatrix Caston.”

“Caston? The niece of the current Prime Minister?” asked Watson.

“Yes,” Blake answered. “The surprise is that she married a man with even a hint of scandal, but *omnia vincit amor*. And to all appearances Mr. Phillimore did reform; the worst one can say is that he still occasionally sees friends from his youthful days, although in sedate circumstances.”

“What friends?”

“For example, Sir Ernest Larchmont, Bart.”

Holmes stood and strolled to the window as he asked Watson, “Do you know Larchmont, Watson?” He remained gazing out of the window.

Watson coughed. “I know *of* him. He runs with a fast set, and has backed several plays in the East End in recent years. Friends with that poet Wilde and the novelist Stoker.”

“And does this touch on your case?”

“Yes,” I said. “Mr. Phillimore insured his life three years ago and named his wife and infant son as co-beneficiaries. They are still the beneficiaries, even though he and his wife separated last year.”

“Was it amicable? What were the grounds?” Holmes asked as he returned to his seat.

Blake answered, “Mrs. Phillimore refuses to say, but to all appearances the separation was amicable. And that brings us to the point, Mr. Holmes. On March 14 last, Mr. Phillimore had arranged with his coachman to take him to work, the day being blustery. He started to enter the coach, but then asked

the coachman to wait while he got his umbrella. The coachman states that Mr. Phillimore went into the front entrance of the house but never came back out.”

Watson asked, “What do you mean, he never came out?”

“Exactly that,” I said. “After some minutes, the coachman knocked on the front door and inquired about his master. This astonished the butler, who remarked that Mr. Phillimore had left by the front door and had not to his knowledge returned. He canvassed the domestic staff, who all echoed his statement.”

“A large staff?”

Blake consulted the file. “Besides the butler and coachman, there is a cook, scullery maid, three housemaids, a footman, and two gardeners. After some confusion, the coachman decided to go to the police, much to the displeasure of the butler.”

“Why was he displeased about this step?”

“The butler Bassett is an autocratic individual, running the household in a very dictatorial manner. It was his opinion that the master had simply changed his mind about taking the coach and had left by another entrance, and would return in good time. There was no matter for police.”

“His reasoning is sound. But did the coachman go to the police?”

“Yes. They searched the premises at the insistence of the coachman, but found no trace of the missing man. Their reaction was then much the same as that of the butler. However, when several days had passed and Mr. Phillimore had not returned, the police took a different view of the matter. After a vigorous investigation, during which they had at various times charged most of the staff with crimes ranging from fraud to murder, they had to admit that they were completely flummoxed.”

“And now two months have passed. What has changed that now causes you to seek my aid?”

I answered, “As mentioned, Mrs. Phillimore is the beneficiary of the life insurance policy, and has filed an action in court to have Mr. Phillimore declared legally dead and the proceeds of the policy paid to her. And as Mrs. Phillimore is very well-connected, we think that there is a high probability that the courts will do as she has petitioned. Our request to you, Mr. Holmes, is that you find out what happened to Mr. Phillimore. Is he alive? If he is dead, what happened to him? Our policy has the usual exclusion for self-destruction, so for us a proof of suicide would be sufficient.”

“But can the courts arbitrarily decide that someone is dead?” Watson asked. “Doesn’t there have to be a corpse, or a lengthy passage of time?”

“No in both counts, Watson,” Holmes replied. “The Williams case in Oxford last year is an example, as is the Abernethy scandal in Ohio. Murder can be proved without a corpse – indeed, many murderers have hanged without a corpse in evidence. And where there is sufficient reason – say, a disappearance from a ship while at sea – a court can declare death immediately.” He turned his gaze on us. “Or, let us say, where the interested parties are of great political influence.”

“Exactly, Mr. Holmes.”

“What about the staff? Were they reviewed? And were they questioned about the disappearance?”

“Yes,” put in Watson. “My thoughts exactly. Perhaps the separation was because of improper relations of Mr. Phillimore with one of the maids.”

Blake again consulted his notes. “The butler Bassett has been in service with Mr. Phillimore for 12 years. No indications of problems and nothing is known against him. Bassett had come to the staff on the recommendation of Sir Larchmont. The head maid is a Miss Vane, who joined the staff concurrently with Bassett.” He smiled thinly. “She is in her 50s and very proper. I doubt there was any chance of dalliance there. The other two maids have come recently on staff, after the separation. Mrs. Havisham, who came late last year, is a married woman in her 30s and does not sleep in. Mrs. Brown is a widower in her late 40s who came last month from the establishment of Sir Larchmont and also does not sleep in. The cook, Mrs. Liddell, is a rather formidable personage, and the scullery maid is her daughter. The footman, the gardeners, and the coachman ... well, in short, the staff have all been thoroughly questioned by the Yard which has found nothing to implicate them in the death or disappearance of Mr. Phillimore.”

Holmes considered. “Surely they checked the obvious connexion?”

Blake inquired curiously, “What obvious connexion?” Holmes said deprecatingly, “No doubt it is too obvious.”

Blake glanced in bafflement at me, and then asked, “Can we count on your help, Mr. Holmes?”

“I will see what I can do. Have you a picture of the absent Mr. Phillimore?” I handed him a copy of the missing man’s portrait, adding, “His hair is rather fine and light brown. He has a large scar on his right forearm as a result of an accident in his youth. He is somewhat above average height but of slight build, and he is in his late forties.”

“Ah, one of the dedicated workers who has delayed family obligations in pursuit of professional success.” He rose and proffered his hand. “You gentlemen will hear from me.”

Blake and I returned to the office. “Do you think Holmes can help us? And how did he know that information about you?” he inquired.

I just smiled in return. “Mr. Holmes is a very remarkable man, and I think he will be able to help us. The police have been of more enthusiasm than penetration.” We parted, and when I returned to my office my assistant Collins was waiting. “I need your assistance with this case, Mr. Spenser. A request for an annuity from a Mr. Dorian Gray.”

A few days later Holmes requested me to come to his lodgings. I took the Phillimore documents with me again and walked to Baker Street, enjoying the fine spring morning. I found Holmes at the window again, and Watson seated, and asked if the case had been resolved. "Not yet," he replied, "but I have definite hopes. I understand that you are acquainted with my brother Mycroft."

"Your brother is Mycroft Holmes?" I asked in astonishment.

"Yes, my elder by seven years. He sent me a note asking that I assist you, and mentioning that he met you in connection with Mr. Babbage's celebrated difference engine."

"It was handsome of him to take an interest. I have been engaged in research using the difference engine and your brother has been kind enough to provide some assistance with funding and government contacts."

"I have heard of this engine," Watson said. "Is it true that it can tell the answer to any question?"

I laughed. "A common misconception. Think of it as a quick abacus. It will revolutionize working with large numbers, which is after all important to my profession. If developed to its full potential, it could relegate the role of computers to the past. It will certainly make it easier to substitute facts for appearances and demonstrations for impressions."

"Mycroft says that you have had some singular suggestions for its improvement."

"Yes. The idea involve ... but Mycroft has asked me to keep my proposals secret. I can only tell you that it would make the use of the difference engine many times faster."

"Amazing!" cried Watson. "What a marvelously modern age we live in."

"And so we do," seconded Holmes with a smile. Then he turned to me and said, "I thought I would let you know what I have discovered in connexion with your case."

"A resolution already?"

"Not yet. I discussed the matter with Scotland Yard Inspector Lestrade, who has been in charge of the case. The police are of the opinion that Mr. Phillimore simply chose to leave and perhaps start a new life, and that there is no case for them to pursue."

"Are you of this opinion?" I queried.

Holmes steeped his fingers and replied, "The official position does have merit. In this day and age it is easy to disappear if one chooses. In the colonies, distant countries, or even the United States western territories it is easy to make a new life with no questions asked, especially if one has money."

"We checked with his bankers, Mr. Holmes. There was no indication that any large sums had been paid out or transferred, as if in anticipation of a flight."

“That is correct. However the official view is that Mr. Phillimore had saved sufficient funds over time from his large income, with no one the wiser – a supposition impossible to disprove. But the flight to start a new life is not one I favor. There was no indication that Mr. Phillimore was in any trouble either professionally or personally. He had recently separated, but without public scandal, and had a large circle of friends – including, it is true, some friends of the unconventional type. He had no debts. His office recently concluded an audit of its affairs at the request of Scotland Yard but found no irregularities. There is no record of Mr. James Phillimore leaving the country, or even leaving London. In the past three days using my unofficial resources I have failed to find any unidentified person of his description leaving. No, I think we can discount flight to a distant land.”

Holmes leaned back in his chair. “I next considered the possibility of kidnapping – which the Yard, to their credit, have also considered. I rejected it as they have done. There has been no demand for ransom. What about greed? *Cui bono*? In this case, no one. What about revenge? As I mentioned, Mr. Phillimore had no debts. He did not gamble immoderately and, as far as I can tell, had not injured anyone either in his private capacity or in his position of Director at Cox. There appears to be no one who resented his advancement at Cox; indeed, the staff seem fond of him. No, I think we can safely discard the notion of kidnapping.”

“Next, I contemplated suicide. Again, for many of the same arguments noted, I rejected it. Besides, where is the body?”

I put in, “I wondered whether his domestic staff might have covered up his suicide in order to protect his reputation. They were very loyal to him.”

“But the body? What could they have done with the body? Thanks to the actions of the coachman, the police were on the scene shortly after his disappearance. They found no evidence whatsoever of a body or of a death. Questioning of the neighbors and those in the area proved that no packages, such as might conceal a body, were removed from his residence that day. Whatever the shortcomings of the official constabulary, they are energetic and well able to conduct investigations of that sort. No, suicide is not tenable.”

“But that leaves only murder, Mr. Holmes.”

“There is another option.”

“What is that?”

“The possibility that Mr. Phillimore was in hiding at his residence at the time, and perhaps elsewhere later.”

“But the search...” I stopped as Holmes waved his hand dismissively. “I know of at least three ways in which such a ruse could have been accomplished,” he said. “I have also spoken with the domestic staff. Of course, with the master not in residence, there is little for the staff to do, and the butler Bassett has let two of the maids, the footman, and one of the gardeners go.”

Watson laughed at this point. "I was told that he tried to remove the scullery maid, but the cook understandably was upset. She is rather intimidating, and Bassett was forced to back down."

"Did you see the staff members who had been let go?"

"Those that were available – yes."

"What do you mean, those that were available?"

"Mrs. Havisham is now doing maid service at the household of Mrs. Phillimore, and..." I broke in at that point, "Surely that is unusual – Mrs. Havisham started at the Phillimore home after the separation. Was there any prior relationship? This looks suspicious to me, Holmes." I could see that Watson agreed with me. Holmes nodded approvingly. "I have my eye on the lady – and I questioned it as well. The explanation was that they had met when Mrs. Phillimore had visited her husband's home in connexion with monetary arrangements and visits of the young heir with his father, and as Bassett and previous employers had given Mrs. Havisham sterling references, Mrs. Phillimore hired her."

Watson harrumphed. "Still think that is odd, Holmes."

"And the others?"

"The widow Brown returned to the establishment of Sir Larchmont, from which she had come. I spoke to Sir John about her, and he informs me that she only recently took service, owing to the death of her husband. The displaced gardener and footman, however, seem to have disappeared."

"That is disquieting. Could they, perhaps, have been in collusion, and have now fled before they are arrested?"

"It is possible, but it is equally possible that they are merely two out of work men who have vanished among the teeming millions of London. I have my Baker Street irregulars on the job, and have hopes of catching them up.

"Irregulars?"

Watson explained, "A group of street arabs, but dependable."

"Yes," Holmes agreed, "and excellent agents. They can go anywhere and hear anything."

I sat back and considered. I finally asked, "Have you formed any theories about the disappearance, Mr. Holmes?"

He regarded me severely. "I never theorize in advance of the facts. If so, one inevitably starts to twist facts to fit theories, rather than theories to fit facts."

I acknowledged the rebuke, and stood up. "This has been most interesting, Mr. Holmes. Do you think that we are any closer to the answer to this strange disappearance?"

He stood also, telling me, "As I said, I have great hopes that there will shortly be a resolution." I made my farewells and walked slowly back to the office, the facts of the case whirling about me. I was sure that somewhere in the amassed facts the answer lay if I could only see it. I ignored my surroundings as I mused on the case. And suddenly, I knew the answer.

At this point in my perambulations I had stopped at a busy intersection on the Strand, waiting for a chance to cross. Suddenly I was rudely jostled by a man, literally pushed into the path of a heavy waggon. Another man with a long beard grabbed me and pulled me from danger. "You must watch where you are going, Mr. Spenser" he said with a smile.

"Holmes!" I cried in astonishment. "But how .. what does this mean?"

"That can wait," he admonished me, and darted up a cross street. Mystified, I followed. Not far away was a small knot of men pinioning the arms of another man. "So you got him, Lestrade!" exulted Holmes. "Excellent." He introduced me to the small detective, who gave him an object. Holmes in turn offered it to me. "My documents case!" I said hollowly. "I never noticed it was missing. But how..."

Holmes told me to wait while he and Lestrade concluded their business. The Inspector and his men departed with their captive, and Holmes, Watson, and I took refuge in Simpson's. I ordered a brandy and asked Holmes for an explanation. "Not that I am upset, you understand," I assured him. "You saved my life. That waggon would have ... and my documents! What is going on?"

Holmes laughed. "As I said, my brother Mycroft asked me to help you. Your work on the difference engine has not been as secret as perhaps you thought. There is considerable interest in the topic in, shall we say, other countries as well as in this. You have been under surveillance for some time. You were followed both times you came to my office. I could see your shadow when I stood at the window. The same man both time, careless of them."

I just shook my head. "I had no idea. But who are they?"

"In this case I am sure that Hugo Oberstein was the mastermind, although there may not be any proof."

"Who is this man?"

"An unofficial agent of the German government. Perhaps this time he has stretched out his hand far enough that he cannot bring it back before we can prove his complicity."

"It is fortunate that today, the day he acted, that you were there to assist."

Holmes said drily, "It is no coincidence. We have had you and your shadow under watch since the first day you came to Baker Street. Oberstein and his men thought that the materials in the document case had to do with the difference engine." He laughed again. "It would have been interesting to see their faces when they examined the documents, had they succeeded in taking them. Through the actions of my brother, word was leaked that you would consult me today on the difference engine, bringing your

plans with you. You were closely watched on the way to Baker Street, but they held their hand until your return, as you saw.”

“I indeed owe you a great debt, Holmes, and you also, Watson,” I informed them. “And in return, I can solve the disappearance of Mr. Phillimore.”

They both stared at me. “Could you explain?” asked Holmes.

“I’ll show you,” I answered. “But to do so we must speak with Sir Larchmont.” We paid our tab, hurried into the street, and hailed a passing hansom. Despite my friends’ attempts to draw me out, I held my peace until we were admitted to the presence of Sir Ernest Larchmont.

Sir Larchmont was a large man of upper middle age, who received us graciously though we had no appointment. “Would you care for tea?” he asked politely, after I had been introduced. “I assume this has to do with the disappearance of James Phillimore.”

“Yes it does, Sir Ernest,” I responded. “Thank you for allowing us to presume on your time.” At that point a maid entered, and I could tell from the description in the case files that the maid was Mrs. Brown. I waited as she dispensed cups of tea to Mr. Holmes and Dr. Watson, and when she offered me a cup I ignored the cup and grabbed her hand. “This won’t do, you know, Mr. Phillimore,” I said.

I could hear a choking noise from Watson, and a crash as he dropped his teacup. “I am sorry, sir,” the maid said as she tried to get out of my grip, “I am sure I don’t know...”

In answer I reached and slid back the sleeve from her wrist, exposing a large scar. “You *are* James Phillimore,” I said. He recognized the futility of denial, and said simply, “Yes, I am he. But how did you know?”

“The answer was obvious, once I considered the facts of the case. What had happened to you? You had disappeared, and one by one alternate explanations were ruled out as impossible. And when you have eliminated the impossible, whatever remains, however improbable, must be the truth. Your long friendship with Sir Ernest, the convenient appearance of Mrs. Brown, your involvement in the circle of Wilde and his friends – I also have friends in the theatre – your strange disappearance, all led me to the conclusion that you were masquerading as Mrs. Brown.”

Sir Ernest said, “You are completely correct, Mr. Spenser. Jim spent some time here as Mrs. Brown in order to establish her bona fides, and he played two parts at his home for the short time we thought necessary to establish her identity. You see, I love Jim, and he loves me.” At this point Mr. Phillimore went and stood beside the Baronet, who reached out and took his hand.

“I knew,” Mr. Phillimore said quietly, “that my marriage to Beatrix was wrong, but I wanted an heir. But after a few years, I couldn’t stay away from Ernest. I love my wife after my fashion, Mr. Spenser, and I don’t want to hurt her. The scandal would destroy her if it became known that I ... that Ernest... and so I decided I had to disappear.”

“Does your wife know of your affections?”

“She suspects. It was she who requested the life insurance policy, and as my wife she could obtain a policy without my signature. I had no wish to defraud your company, but I couldn’t continue leading the lie I was living. I had to leave, and tried to do so in a manner that would not cause my wife or son scandal or anguish. But I cannot – I cannot – return to the life I was leading. I would sooner die.”

Sir Ernest said, “And you at last know all, and I ask you what is to become of us?”

I replied, “However distasteful I find your actions, Sir Larchmont, I cannot condone the heavy penalty that our society would force on you if all became known.” He and Phillimore looked at one another relieved. “At the same time,” I said, “I have an obligation to our stockholders,” and the look of worry returned to Sir Ernest’s face. “So you mean to tell the police?” he asked.

“There is an alternative,” Holmes said quietly. “You are a wealthy man, Sir Larchmont. If I may suggest, say, a special investment of ten thousand pounds in Empire Life?”

I nodded. “Yes, that should do. I will ask Mr. Blake, our solicitor, to call upon you at your convenience.”

“And the, ah, other matter?”

“I will recommend that our company drop its opposition to Mrs. Phillimore’s action at law.”

Sir Larchmont stood and held out his hand. “I thank you, Mr. Spenser. And Mr. Holmes, and Dr. Watson. No, we thank you.”

The ride back to town was quiet. As I got out of the carriage, Holmes gripped my arm. “A masterful piece of detection,” he said.

“I could not have done it without your assistance, Mr. Holmes. Perhaps we will get the opportunity to work together again in the future. As a matter of fact, there is a case involving trained cormorants and a lighthouse that has recently arisen. Perhaps, sir, if I may call upon you next week?” Holmes agreed, and I returned to my office. I was writing a memo to Blake when Collins knocked on my door. “Sorry to bother you, sir,” he said, “but I have some questions on this life insurance application from Dr. Henry Jekyll.”

Another Green World

Chris Fievoli

Eugene Hartz knew he would have to do something about that vine. It had infiltrated the living room of his house three months ago, and now stretched halfway across the bedroom floor, presenting an obvious hazard every time he walked by. He had meant to get a permit to remove it, but the waiting period was now up to fifteen weeks, and even then it would cost him several hundred dollars. Cutting it himself was a tempting prospect, until he remembered that the fine for doing so ran into the thousands, with the additional threat of actual jail time. His conclusion, once again, was to deal with it some other day.

It was only seven o'clock, and already the repressive heat of the day could be felt in the kitchen of his home, which was in the unfortunate position of having a southern exposure. Breakfast would consist of a few pieces of fruit that he had purchased the day before. It was pointless to buy anything these days that ran the risk of spoiling. His icebox was woefully inefficient against the late June humidity, even when he could find a carton of milk that wasn't already partly sour. This was not the time of year to be particular about what you ate.

He left his house shortly before eight, walking down the pathway to the main road. Fortunately, he had opted to put ten-foot high wooden fences down each side a few years back, which kept what used to be a front lawn at bay. All types of weeds and foliage burgeoned on either side, just looking for the opportunity to burst forth and overwhelm the walkway. A couple of hours with a scythe and a good pair of shears would take care of the problem, but that was out of the question – unless you wanted to risk incurring the wrath of the local environmental protection authorities.

The morning traffic was heavy as usual. Hundreds of people made their way along the center of the boulevard – several walking, most of the rest bicycling, with a few affluent commuters opting for personal rickshaw rides, pulled along by a number of well-built and permanently exhausted-looking young men. Eugene always opted for the rickshaw, one of the few extravagances he allowed himself as Chief Actuary of the Exilon Life Insurance Company. He flagged down the first empty carriage he saw, and settled in behind the driver.

As they weaved their way through the human traffic, Eugene liked to imagine what this street would have looked like fifty years ago, when cars and buses were still around. Even more crowded, from what he understood, and moving about as quickly. And apparently the air was so thick with smog and other pollutants that you could barely breathe. He wasn't sure he believed that. Eugene didn't give a lot of credence to the historical revisionists that tried to convince everyone that the world was now a much better place without fossil fuels. In his opinion, society had taken several steps backward in the last few decades. But that was a moot point now. There was evidently no chance of going back.

It had all started a few years before Eugene was born, when the federal government passed the now infamous Green Recovery Act. The scope of the bill was massive, effectively banning all "non-natural" fuel sources, including oil, gas, coal, and nuclear power. The intent was that they would all be replaced by "green" energy, primarily solar and wind. But, as the government seemed to do time and time again, the implementation was far from successful. They did a great job of shutting down the traditional fuel sources, but the replacement sources were never developed effectively. Without the requisite supply of fuel, most sectors of industry ground to a halt. All forms of powered transportation - automobiles, airplanes, trains – soon disappeared. The economy plunged into a deep recession – some say depression – as unemployment soared and economic growth stagnated. When home heating became impractical, millions of people migrated to the warmer climes of the southern states, leaving vast tracts of northern land uninhabited. The population of Canada dropped from just over forty million

to just under ten thousand, and eventually became annexed by the city of Detroit. The population surge to states like Arizona and California – where Eugene now lived – stretched what was left of the social infrastructure to its breaking point. When the power grid finally collapsed, that was the nail in the coffin. The country looked very much like it did two hundred years previous – except with a massive amount of leftover industrial waste that was left to rot, rust, and crumble. Eugene saw it everywhere, especially on his trip to the office each day. Abandoned factories lined the road, with buses and cars littering the ground in between, turned into makeshift storage units and, sometimes, permanent residences.

It was frustrating, but what could you do? Eugene decided that making the best of the situation was the preferred approach. Others – and this is where he always thought of his brother Hanley – had different ideas. He wondered what Hanley was up to these days. It had been a few months since they had spoken, which was pretty normal. The two of them ended up on distinctly different paths in life - Eugene being the academic destined for a career in business, whereas Hanley was the rebellious younger brother, always looking to square off against The Establishment (whoever that was). Much to their family's consternation, Hanley had fallen in with a benign but radical group of traditional energy advocates, who in spite of a far-reaching government ban on such sources, were determined to bring back gasoline and electrical power, one way or another. Fortunately, their activity was mostly talk and very little action. One year, their plan was to build a small-scale oil refinery. By the next year, they had changed priorities and said they would restore a limited power grid. No one took them too seriously, which was the only thing keeping Hanley from getting into serious trouble with the government officials. But, to be honest, there was something that Eugene admired about the life Hanley had chosen, even if it did mean little more than a marginal existence for him. He had to admit there was something appealing about it.

Eugene was roused from his daydreaming as they reached the huge warehouse where the financial reporting division of Exilor Life was situated. Thousands of people streamed into the building, ready to start another mind-numbing day of manual calculations and paper shuffling. And there was a lot of paper to shuffle. Piles of it, mounds of it – covering the entire warehouse floor, and stacked several feet high in places. Among the piles, the employees went about their daily activities, performing their requisite calculations, handing them over to another colleague to be checked, and then moving on to the next set of numbers. Eugene felt sorry for them – surely there were more rewarding and productive ways to spend one's working day.

All of this work – done with pencil and paper, without the benefit of any electronic calculators – did serve a purpose. A supervisor would aggregate the numbers, and then pass them on to his superior to be further aggregated with numbers from a different unit. After the process was repeated through several levels, it eventually landed on Eugene's desk for his final approval. What they were doing was painstakingly calculating a reserve value for the thousands of policies on Exilor's books, a process which took a ridiculously long time, but was also a necessity. Later this month, he expected to finally be able to produce a set of financial statements for the year 2072 – which was now almost eight years ago.

Further complicating things was the fact the Exilor had purchased several blocks of business many years back, as the ability to do electronic computing fell by the wayside. Traditional insurers were eager to unload their complicated portfolios of universal life business, which Exilor scooped up for bargain prices. Of course, this meant an administrative nightmare as they tried to manage the financial side of the business, but that was now a done deal. Eugene's job now was to make sure it was done as accurately as possible, which was a challenge most of the time.

As he walked into the building, Eugene ascended the stairs to his office, which offered a panoramic view of the floor below. The heat in the building would be stifling before mid-morning, especially in the upper recesses where he sat. Fortunately, he had access to the only windows that could be opened, the lower ones being permanently shut, lest a breeze blow over a random stack of papers

and set them back several weeks. As he looked at everyone below, mindlessly performing their repetitive duties hour after hour, he wished there was some way he could liberate them from this drudgery. But the work had to be done, and he didn't have a better alternative.

He set to work on the pile of documents that sat on his desk, which seemed to be eternally huge. Fortunately, he was getting very good at determining which ones needed immediate attention, which ones could wait, and which ones could go directly into the trash can. It was necessary to do so if he wanted to have any chance of being remotely productive.

By nine o'clock, it was time for his regular meeting with his senior managers, who somehow managed to make sense of the chaos that transpired each day on the floor below. Vince Hallman, his chief resource manager, was always the first to speak, and almost always had bad news to report.

"We had a total of twenty-two resignations yesterday, which as you know, is higher than we're used to at this time of year." Vince was several pounds overweight, and the stress of his job was evident. By this point in the morning, his perspiration had soaked right through his suit jacket. Eugene wondered how that was even possible.

"Is that going to slow down production?" Eugene asked, not really wanting to hear the answer.

"Possibly. Nine of them were working on the McKinley Life block."

"Wonderful. We're already eighteen months behind on that block. That's not going to help." It was Linda Cash speaking now, who was responsible for workflow management. "Can't we redeploy people from one of the other workgroups to get things back on track?" She always scowled as she spoke, which by now had caused a crease to permanently run down the middle of her forehead.

"Not the same skill set," Vince replied.

Linda wasn't buying it. "Come on, Vince. These people are just doing the same calculations over and over. Surely they could do the same thing for a different set of policies, couldn't they?"

"Not that easy," interjected Mark Fischer, who was Eugene's senior actuary responsible for standards and control. "The McKinley products have some pretty complex minimum credited rate guarantees that need to be factored in. I wouldn't want to throw someone into that without a fair bit of training." Mark always appeared to be the cool and relaxed one, although the fact he was bald by age thirty-two indicated that he wasn't immune from stress either.

"Four of our resignations were from the training unit," Vince added. Linda just rolled her eyes and exhaled noisily.

Eugene could feel their tempers starting to flare, which was not unusual. Most of their meetings were dangerously close to dissolving into acrimony. "Linda, leave that with me," he said. "Maybe Mark and I can do some approximations to get us by for the time being."

Linda shrugged her shoulders. "You're the one signing off," she said.

"That's right. I am," Eugene replied. He hoped it would give his team some solace, even if it did incrementally add to the numerous things he had to worry about.

The rest of the meeting dragged on, as they worked through the new crop of issues that had arisen over the past day. Eugene tried to maintain a positive outlook, but it was admittedly a struggle. By the time the meeting ended, he thought he was successful in that regard, until he noticed that Mark was waiting for the others to leave. "What's bothering you, Eugene?" he asked as they exited the room.

"What makes you think something's bothering me?" he protested.

"You spent the whole meeting spinning with your pencil around. You always do that when something's on your mind."

Eugene forced a smile. "You're very perceptive," he said. "And you're right."

"So what's up?"

Eugene stood up, turning his gaze to the floor below. "You know, we've got thousands of people working on these calculations, doing them all by hand, checking them over, and passing them up the

line. It takes months, sometimes years, before the numbers get to me. And what do I do? Put on some arbitrary margin, knowing that any one of a hundred things could have gone wrong along the way.”

“Spurious accuracy,” Mark said. He always had a nicely concise way of summarizing a problem.

“Exactly,” Eugene replied. “You know, I could take one of our reserve figures, do a bit of trending, and come up with a fairly reasonable estimate in about an hour. I don’t see why we have to grind through every single policy.”

“Because that’s the way things used to be done,” Mark declared. “When we had computing resources, we did things on a seriatim basis because we had the ability. Now, of course, we don’t have that ability anymore. But no one’s said that it’s OK going back to something more reasonable. I mean, if you want to take it up with the regulators, be my guest.”

Eugene waved his hand at the idea. Everyone knew there was a four-year waiting list to get a hearing with the state insurance commissioner. “It would be pointless,” he muttered.

“Exactly. And it’s pointless to complain about it. That’s just the way it is, Eugene. And everyone’s in the same boat. You’re not being singled out, if that’s any comfort.” Eugene managed a smile at that comment.

They were momentarily interrupted by the mail courier, who walked in and dropped a foot-high stack of envelopes on Eugene’s desk. There was a time when people were cavalier about the amount of material they sent through e-mail; it seemed as if they now felt compelled to send the same amount via hardcopy.

“Looks like you’ve got some work to do,” Mark said. “I’ll catch up with you later.”

Eugene sighed deeply and began to sift through his mail as Mark departed. Most of it was pretty standard, but one envelope caught his eye immediately. His heart quickened with a mix of anticipation and dread. He recognized the handwriting on the front, and tore it open to read the contents. It was a short, scrawled note:

Hey, brother! How is everything going? Just wanted to let you know that I’ll be back in town on the 24th. Hope you got some time to visit. Got something that you might find interesting! Don’t work too hard. I’ll see you then! - Hanley.

The 24th. That was today.

That was the damndest thing with the postal service these days. The recently re-established Pony Express was pretty effective at delivering the mail, but if you were headed somewhere, it was just as efficient to bring the message yourself.

Eugene tried to focus his mind on his work, but he knew it would be difficult. Hanley’s visits were rarely just to connect. Occasionally, he asked for money, a request to which Eugene always reluctantly obliged. Or it was because Hanley had other “business” to tend to in the area, which was usually with shadowy individuals that, fortunately, they never discussed. As to the “interesting” thing he had, Eugene would just have to wait and see. Hanley had the good sense not to show up at the office, so Eugene fully expected to see his waiting at his house in the evening.

He found him crouched on the front step, looking through a crumpled leaflet. He looked lean and wiry as ever, his tan a bit darker, his beard trimmed into a neat goatee. Eugene had to admit that he looked good, for someone living what he presumed was a pretty rough life.

Hanley leapt to his feet as soon as he spotted Eugene. “Hey, my man!” he shouted as he enthusiastically threw his arms around his brother.

“Good to see you, Hanley. Come on in.” Hanley grabbed his dirty knapsack and hustled through the door.

“Damn. What a journey!” Hanley said as he collapsed onto the couch. “Almost made it here in record time, but it nearly killed me!”

“And where did your recent travels take you?” Eugene asked.

“East coast for most of the time, and then a couple of weeks up in Montana. There’s an abandoned uranium mine that some of my guys are looking at.”

Eugene tried not to laugh out loud. “So what, you’re looking to build a nuclear reactor now?”

“Don’t scoff. We got a couple of PhDs in our circuit now, who just might have the smarts to make it happen.”

“Just don’t end up blowing yourself up or anything. If you come back here glowing the dark, I’m not letting you in the house.”

Hanley shrieked with laughter. “I wouldn’t blame you, brother!” He looked at the floor, and shook his head. “One hell of a vine you got there!”

“Don’t remind me.”

Hanley reached over and grabbed his knapsack, placing on the floor in front of him. “Hey, check this out. I have a gift for you.”

Eugene seemed impressed. After all the favours he had done for Hanley over the years, were they about to be returned? “Very kind of you. What have you got?”

Hanley looked both ways, as if he wanted to make sure they weren’t being watched. He then reached into his bag and pulled out what appeared to be a huge chunk of plastic, about the size of a sheet of paper, but at least an inch thick. “Check this out,” he declared proudly, as he placed it in Eugene’s hands.

Almost immediately, Eugene saw the logo that was embossed on the front – a circle with four letters, the second one tilted at an angle. The letters spelled “DELL”. Eugene’s hands began to tremor slightly. If it was what he thought, it was remarkable. And dangerous.

“Flip it open,” Hanley implored.

Eugene complied. The screen came to life, glowing in front of him. It occurred to Eugene that this was the first time he had ever seen artificial light. He was mesmerized.

“It’s a bit of an older design,” Hanley explained matter-of-factly. “Still has the old-fashioned keyboard.” Eugene recognized the layout from when he had to use the office typewriter for some official business a while back.

“You do realize this is illegal,” Eugene intoned quietly. Personal computers had been banned decades ago, cited as one of the largest wasters of energy.

Hanley’s response was to burst out in laughter.

“So, what? You think some government officials are going to burst through the door and arrest us? Come on! They can barely figure out how to issue bicycle permits. Relax!” Still, Eugene was reticent. Hanley sensed this, and retrieved the laptop from his hands.

“Come here,” he said, inviting Eugene to sit beside him at the wooden dining table. “You’re the numbers guy. This is something you’ll appreciate.”

Eugene watched with rapt fascination as Hanley swiped his fingers across the metallic pad at the base of the keyboard, causing the arrow on the screen to dance around. He knew this was technology in action, something he had read about, but never experienced first-hand. It was infinitely more fascinating than he could have imagined.

A moment later, they sat looking at what appeared to be a large grid on the screen. “This is what they called a spreadsheet program. It was called Excel,” Hanley explained. “Lets you do some basic calculations without using the old pencil and paper.” Eugene watched as Hanley took him through a few examples, demonstrating how to perform the basic operations and quickly generate columns of numbers. At first, he was fascinated by how, when you pressed a key, the value magically appeared on the screen. But soon, he began to contemplate just what possibilities lay ahead of him.

Hanley could sense his brother's interest. "Here," he said. "I'll let you play with it for a while. I'm going to go hang some blankets over the windows so nobody sees you."

The joke was lost on Eugene. He was already totally engrossed in this newfound tool, oblivious of anything else around him.

Hanley eventually fell asleep on the couch, awaking shortly after dawn. As he rubbed his eyes, he spotted Eugene, still seated at the table, now confidently maneuvering around the keyboard. Dark circles had formed under his eyes, but he remained intently focused on the screen in front of him.

"Brother, you been up all night?"

Eugene looked up for what must have been the first time in hours. "Oh, cripes! It's morning," he declared, peering out the window.

Hanley shook his head. "What have you been doing all this time?"

"You're not going to believe this," Eugene declared. He spoke quickly, like an excited child. "I figured out that you could do all the basic actuarial calculations on here, literally in a matter of seconds. Look at this – I entered a mortality table, and did all the basic commutation functions instantly! Big A's, little a's, I can do them all! And I can change the assumptions, and everything automatically updates!"

"Slow down, man," Hanley laughed. "You're the actuary, not me. I don't know what the hell you're talking about!"

"What I'm saying," Eugene said, now with more focus, "is that I did in a matter of minutes the work that it takes hundreds of my employees several weeks to do. I just can't believe how much I can accomplish with this!"

Hanley smiled, but he was shaking his head. "So what are you going to do? Bring it into work with you? Power to you, but I don't know how you'll do it."

Eugene cupped his hand against his forehead. "You're right. These things are illegal, aren't they?"

"Oh, yeah," Hanley said. "I think the exact phrase they used to use was that computers had the carbon footprint of Godzilla." Hanley laughed. "That was pretty creative, I have to admit."

Eugene shook his head. "Ok, fine. But if you want to talk about waste, how about all of the countless hours we spend doing manual calculations that this machine can do in a matter of minutes, seconds even? Doesn't that count for anything?"

"You're preaching to the converted," Hanley said. "But do you want to take on a legal system that's declared any and all artificial energy bad for the planet? I mean, if you do, I know lots of people that'll stand beside you, but we're still outnumbered."

The use of the word "we" made Eugene feel a hint uncomfortable. "I don't know," he said. "I have to put some thought into this."

Hanley walked over and placed his hand on Eugene's shoulder. "Then get some caffeine into your system, get into work, and think about it. We can talk tonight."

Eugene nodded. He felt queasy, and he wasn't sure if it was the lack of sleep, or what he was contemplating.

"Eugene, are you OK?"

It was Mark who once again noticed something was off. He sat across from Eugene with a concerned look on his face.

Eugene waved him off. "Didn't sleep well last night, that's all."

"All right. Just making sure. Anyway, you've got to talk to someone about the quality of pencils we're using. They keep breaking, and Linda's too preoccupied to deal with it, and –"

"Let me ask you this," Eugene interrupted, out of the blue. He turned his gaze to the warehouse floor below. "If there was some way to replicate the work that all these people did, would you do it?"

“What do you mean?” Mark was perplexed.

“If we had some sort of computing device that could do their work for them, would we use it?”

Mark shook his head. “Those days are long gone,” he declared sadly. “I don’t know if it would be possible to come up with anything like that today.”

“But suppose we could. What if we could do our work here ten times – no, say a hundred times. Or a thousand times as fast. And with a tiny fraction of the workforce we have now. Would we make it happen?”

Mark shrugged his shoulders. “Hard to say,” he replied. “I think we’re talking fantasyland here.”

“All right,” Eugene declared. “Forget I brought it up.” Mark was too much of a straight arrow anyway. If Eugene was going to pursue this at all, he would need to find people that were more willing to challenge the system.

By the time he reached home that night, Eugene had made up his mind. He would need to make a strong case, showing his superiors how much more efficiently they could work with a little bit of electronic assistance. If he could get them to buy in, they would then need to convince some of the other insurance companies. But if they could get enough of a critical mass, then lawmakers would have to listen to them. The logic of it was obvious; why wouldn’t they agree? It made all the sense in the world. He wasn’t looking to start a revolution – just a return to common sense, a world where artificial power could be seen as a force for good, not for destruction.

But he would need to show them the possibilities first. And that meant taking the risk of actually walking into the office with this illegal piece of machinery, and demonstrating just what it could do. He didn’t know if he had the audacity to do it, but that didn’t matter. It had to be done.

He found Hanley lounging on the couch, his nose in an ancient paperback book. “I think we’re going to do it,” Eugene declared.

“Do what?”

“Take this machine into my company. Show them what it can do.”

Hanley’s eyes lit up. “My brother, the rebel!” he declared excitedly. Then, a calmness. “You sure you want to do this?”

Eugene didn’t have time to debate. “My mind’s made up. In the meantime, I need to make my case.” He flipped open the lid of the laptop, and began typing away. “What I have here is a good start, but I need to add a lot more to it.”

“Be my guest,” Hanley replied.

What Eugene had in mind was an application where all you needed to do was enter the policy data, and the spreadsheet would calculate a reserve. He had the basic actuarial calculations included; it was just a matter of formatting it in a way that a lay user would understand. He hunched over the computer, totally focused on the task at hand, oblivious to the fact that he hadn’t slept in over a day.

He was a few minutes into it, when a tiny flashing orange light caught his eye. It was situated just above the keyboard, in the corner. There were a couple of other green lights already there, but this one was new.

“Hanley, what does this mean?” he asked.

“What does what mean?”

“An orange light. Why is it flashing?”

Before Hanley could surmise a response, Eugene had his answer. A balloon popped up on the screen, warning him that the battery was low.

“It says low battery. What do we do?”

Hanley raised his hands in front of him, indicating that he had no idea. “I don’t know! They just gave me the machine, and...”

“Well, we have to do something!” Eugene shouted. He felt a wave a panic wash over him. “I just need a few more hours to get everything together!”

Hanley was speechless. “I don’t – I can’t think,” he stammered.

A moment later, Eugene watched in horror as the screen went black, save for the words “Windows is shutting down.” Then those words slowly faded as well, and the hum of the machine went silent.

Eugene stared at it blankly. Hanley didn’t know what to say in response. An uncomfortable silence settled over the room.

Before computers were banished altogether, technological advances had resulted in a laptop battery that would last several days, as opposed to a few hours. That was one of countless developments that were lost in the rush to save the planet. In retrospect, Eugene would have been happier not knowing they existed at all. Having a taste of how things once were, and then losing it, was much more painful than not ever knowing in the first place.

Hanley would stay for a couple of days, but eventually the guilt over what he put his brother through would catch up with him. So he eventually politely said goodbye, offering him a story about an underground project to develop a coal-fired generator. He said he would be back, but knew it would have to be several months.

Eugene fell asleep early that night, caught up on his sleep, and returned to the office the next day. He tried not to look at the thousands of people that trudged in ahead of him, spending another unfulfilling day on the warehouse floor, pushing papers and scratching out calculations. It was too disturbing to think about how it could all have been different. He banished the thought from his mind.

And when he returned home that night, exhausted and dispirited, he stepped into the living room and took a look at that stupid vine that stretched across the floor. Without another thought, he walked into the kitchen, returned with a bread knife, and cut the damn thing in half.

THE BUS RIDE

by Jack Fahrenbach

It has been three years since the Great Bombing attacks occurred on Tuesday, June 6, 2023, in our four largest cities. The millions of deaths caused by the attacks will forever remain beyond our comprehension. From that there is no recovery. And the destruction and economic devastation was almost beyond measurement. But from that we are beginning to recover.

The economy is improving through the efforts and hard work of many individuals across the land and through the collective actions of many in our public and private institutions. Governments, corporations and private investors have all contributed. People in our life insurance companies are helping the economy become stronger by keeping families financially stable with many types of benefit payments during the turmoil of these times. And one very important, special and perhaps unexpected way actuaries from those companies help is by providing timely and trustworthy information about the recovery directly to families so they can deal with the chaos caused by the Great Bombing.

2023

As Chief Actuary of my company, I think that help from actuaries can probably best be understood by remembering that in 2023 our country had become more deeply divided politically than at any time in our history since the Civil War. Sizable financial support from conservative business leaders for Republicans more or less offset the ability of the unions and minorities to mobilize their followers to vote Democratic so that neither party was able to garner a consistently strong majority of the electorate. As a sad sign of the times, hate crimes had been rising ever since O'Bama had won his 2nd term in 2012. With a liberal president elected in 2020 and a clearly conservative Congress, things seemed to be coming apart in 2023.

The economy was equally bad. We had never fully recovered from the Great Recession. Inequality was at an all time high in 2023 with 19% of the country living on incomes below the poverty line while the top 1% commanded 80% of the country's wealth. Main Street continued to struggle with unemployment stubbornly staying over 10% and aggregate demand declining as poverty grew. Even some of the Wall Street bankers had seen some down years.

So most of us in the life business were almost resigned to seeing very mixed results. Investment returns reflected the poor economy. Individual life sales seemed fixed in a long term decline. Only the retirement segment showed somewhat decent numbers with Boomers now retiring.

I was in Chicago attending a meeting of the Society as my company's Chief Actuary on June 6. With this extremely troubling economic and political situation, the Academy and Society had proposed a study to analyze the recent history of the life industry and how we got to the present dismal situation, assess the current environment and put forth possible short term futures under various scenarios. Our meeting in Chicago was held to elicit feedback and ideas on what might be in this study. At the meeting, I voiced the opinion that we should do more to help the average person better understand the various financial and economic topics of the day. Given how divided our country had become, the need for objective analysis and unbiased information was

acute, especially for middle class people who didn't have access to private financial advisers. Not everyone agreed.

THE GREAT BOMBING

After the meeting ended, I had taken a taxi to O'Hare for the plane ride back to Madison, WI where I lived and worked. The plane took off and rose in a bank of clouds, turning towards the northwest and Madison. Suddenly the cabin was flooded with a bright, almost blinding light. I remember thinking that we must have broken through the clouds and how bright the sun was but then realized that this light was much too bright for the sun and must be something else. Seconds later, a deafening roar filled the air while the plane was pushed violently from the rear and upwards in a tremendous acceleration. We were all jerked back against our seats as the plane lurched forward. At first I thought the plane was breaking apart but the pilot quickly regained control. When I looked out the cabin window towards our rear to see what have might caused the acceleration, I saw the worst sight possible - a telltale mushroom cloud rising over Chicago. We all had seen pictures of the Hiroshima atomic bomb and knew immediately the horror of what had just happened. Gasps of disbelief mixed with prayers for salvation and curses for damnation for those responsible could be heard from around the plane. After my own initial shock and panic, I made some very frantic cell phone calls back home. All I remember of the rest of the flight were my intense feelings of fear and unbelief.

That night all Americans heard officially from the President's televised report to the nation what they had already seen broadcast during the day about the Great Bombing. He told us four suit case size atomic bombs had been smuggled into the country and detonated in each of the downtown areas of New York, Washington, Los Angeles and Chicago, all at about 1:00pm CST. The President, who was in Texas that day and escaped the Washington bomb, said our scientists had determined that each bomb was about 15 kilotons, about 50% more powerful than the Hiroshima bomb. The core of each city was devastated and the area within a ½ mile radius of the ground zero point was simply gone. He said that the early estimates of the dead exceeded 5,000,000 killed outright by the bombs. And the bombs were extremely "dirty" so that the deaths due to radiation fallout over the next weeks might exceed another 5,000,000. The President actually seemed to slump at the podium when he told us at least 10,000,000 people were killed outright by the bombs or from their deadly radiation. He emphasized that our country's highest priority would be to care for the survivors of the bombing attack.

He told the country, somewhat surprisingly, there was no direct evidence of foreign power involvement in the bombing. The most intensive CIA and FBI investigations in our history were underway along with help from our allies to root out and capture those responsible for the bombing. But so far they had not identified those who did it. Our military and police forces remained on maximum alert. And he assured us that the nation's ability to find those responsible and bring them to justice had not been compromised by the attack.

He went on to say that the federal government had been relocated to an emergency cite already prepared for such a contingency 100 miles west of DC where he was broadcasting from. A special office, the Office of Recovery, was already set up to coordinate our country's return to stability. While many federal government offices were destroyed and over half of congress was unaccounted for at this time, the federal government was functioning. He also emphasized that efforts were underway around the country to maintain supplies of vital material, such as food and

gasoline, at high levels. Hoarding and price gouging would not be tolerated. And next to providing medical care to the survivors and finding those responsible for the bombing, he said that the government's highest priority would be to do everything possible to help those businesses with offices and facilities in the attack zones. The Office of Recovery was at work even now to understand how bad the economic damage was so that aid can begin.

The President closed his telecast with his belief that the country would survive and fully recover. He asked for God's blessing with his ending words.

THE IMPACT OF THE BOMBING ON OUR ECONOMY

The President's speech was quite reassuring and answered many of our questions. And probably all the actions taken by government and private leaders immediately after the attacks kept us from falling off the edge and descending into utter chaos. Although financial panic initially prevailed in the markets immediately after the attack, it was short lived. Both the Fed and the Treasury got going again within the week at the new federal government location outside DC. The Office of Recovery also assured the country that all valid financial payments due from the federal government such as Social Security would be continued and fully honored. And that office was already working round-the-clock with our country's financial leadership so that the banking and insurance system would be fully functional in short order. Oil prices actually declined after a brief spike with the market (sadly) anticipating a reduction in oil usage in the US. Trading of almost all securities resumed shortly, again after a short panic. The precipice was avoided.

But even with these positives, quite a few economists predicted that both unemployment and inflation would increase. The biggest negative was the psychological impact of the bombings. The loss of millions of family members, friends and fellow citizens so suddenly couldn't even be understood let alone dealt with. We were simply overcome with sorrow. The country was extremely depressed and anxious. In addition, tens of thousands of companies were now completely destroyed. Many more were out of business for all practical purposes. It was easy to see why many economists thought we were headed toward worse times.

The path forward was uncertain.

IMPACT OF THE BOMBING ON THE INSURANCE INDUSTRY

Next to banking, there probably wasn't an industry as severely hurt by the attacks as the life business. That was confirmed by the following which was taken from a preliminary report dated June 14, 2023 and prepared by the Life Insurance Sub Group of the Census Bureau's Mortality Committee For The June 6 Attacks:

"The insurance business has been particularly hard hit. While the exact extent of the bombing is not available yet, it is clear that the home offices of many major companies were completely destroyed. The headquarters of companies located in Chicago, Washington, New York and Los Angeles, some of our largest companies, have simply vanished in the atomic infernos of that day. It also appears that the companies headquartered in the suburbs and nearby towns of those four cities were for all practical purposes destroyed."

With over \$12 trillion of life insurance in force in 2003, well over \$1trillion of bomb attack related death claims were incurred on that day. So it was indeed fortunate that the US government had signed the Life Insurance Catastrophic Death Claims Treaty in 2018. Under this treaty, life insurance death claims caused by an Act of God were reinsured among government signers to the Treaty. An Act of God included the type of atomic attack the US had just suffered. However the reimbursement to any one company under the Treaty was after a 20% deductible and was at 50% coinsurance. While it appeared that a substantial portion of the \$1 trillion of death claims, or whatever the figure came to, would be covered, it was likely that at least several hundred billions of claims, maybe over a half trillion, would somehow either be born by US life carriers, the government or simply not paid. No one really knew.

It was also estimated that about 10% of the assets held by life carriers were worth absolutely nothing because the underlying earning ability for those assets were destroyed. And many other securities had significantly reduced value.

The Office of Recovery discussed supplying aid of some type, perhaps loans or tax breaks. But again, it was very uncertain what eventually would happen. Many positive developments were possible but nothing appeared certain.

THE IMPACT OF THE BOMBING ON MY COMPANY

My own company, Life and Annuity of the Midwest, was headquartered in Madison. Like many Midwestern companies, we were started in the early 1900s as a mutual, then demutualized in 1995 and remained owned mostly by our former policyholders since then. We wrote only individual life and annuities.

Since the demutualization, we were in a profitable joint venture with a large international company for our annuity business. Our annuities were 80% coinsured with our international partner, with all of the annuity assets managed by that company. Although most annuity assets were invested in the US, we thought that the annuity deaths and the US annuity assets more or less offset each other with only a small net loss.

Fortunately, most of our life insureds did not live in the four bombed cities since our distribution was focused on smaller, more rural areas. And at least some of our attack related death claims might be recovered from the Catastrophic Death Claims Treaty. We also initially calculated that 5% or so of our assets were substantially impaired. With our relatively low level of excess death claims some of which might even be covered under the Treaty, we thought that our statutory surplus was just slightly negative.

All in all, we were not in too bad of shape financially, especially considering what had happened to many other companies. Although we might be technically bankrupt, we also believed we could continue profitable operations if we obtained a relatively small amount of additional capital from either the international company we wrote our annuity business through or from one of our foreign reinsurers. So we decided to seek some additional capital, trying first with our annuity partner. If they were not interested, our second source would be foreign reinsurers.

FINDING THE BOMBER – A SOURCE OF DIVISION

As worried as people were about the economy, they were most concerned in that first week of the bombing about their own families, about how the bombing impacted their loved ones and friends. They closely monitored the national news about the horrific tragedy in the bombed areas. And they watched for reliable information about the hunt for the bombers. Rumors abounded about who was responsible for the bombing. And there was a growing concern that another bombing might occur. After all, those responsible for the June 6 bombing had not yet been caught. So it was a great relief when the President announced on Sunday of that first week that the bombers had been found.

The President started by telling us that all the bombers were US citizens, people born and raised in this country. He said the core group was three very wealthy, extreme right wing industrialists. These three had planned, financed and managed the whole plot. The FBI had found the three near Dallas. As they were about to be captured, they committed suicide. So some of their secrets went to their graves with them including their motivation for the bombing and what they hoped to gain from it. But the President emphasized that it was absolutely clear from written documents authored by these three and from other unambiguous evidence that this group was the brains and the money behind the attacks. These three had worked with a seven man hate group, also US citizens, who smuggled four suit case size atomic bombs into the country, then into the bombed cities where they were detonated. The President told us that the CIA believed that the bombs were manufactured from existing nuclear weapons, maybe stolen from Russia or from Pakistan. Four members of the hate group had died in the bomb explosions and two others were killed in a shootout with the FBI in western Washington state. The lone surviving member and his foreign connections were still being investigated by the CIA and our allies. The President made it very clear that all nations, including Russia and Pakistan, were vigorously helping in the investigation.

But finding and killing the attackers seemed only to worsen our country's political divide. The President's approval rating dropped to 47% from a high of 72% on the Thursday immediately after the attacks. For some in our country, revenge became the order of the day. Someone or some group had to pay for this terrible deed. There was animated and heated discussion of nuking Pakistan or destroying Russia. More than a few people did not believe that US citizens were actually involved and thought the President was lying about that. Others were upset about the potential costs of rebuilding the bombed areas. It was clear that rebuilding would take many years if not decades and that the costs would be tremendous. Questions about how to do this and who was to pay filled the air.

On the other hand, those who believed what the President said about the two groups of US citizens being responsible for the bombings wanted to come together as a country and start rebuilding as soon as possible with a strong emphasis on solidarity and pulling together, on binding the country up. They had faith that eventually all those responsible for the bombings would be caught and punished using the established and usual forces of justice. What we needed to do right now was to help all those injured, recover economically and get on with rebuilding the country. Revenge only distracted us from this much more important work.

So the national political divide continued.

COLLECTING MORE INFORMATION - ONE WAY ACTUARIES HELPED

During the second week after the bombing as some of the psychological horror of the bombing started to diminish, our CEO and many of us at the company began to realize that we needed more information about the economic impact of the bombing to manage the company as well as possible. It was becoming clearer that immediate, direct access to data about key aspects of the bombing and our recovery from it would help us be absolutely sure that we were not working with false or biased information. For example, while we collected data from our usual sources on the treatment and care of the injured in each of the four cities attacked, we also wanted to keep close tabs on what was being discovered about the effects of the radiation and its impact on longevity. We thought it would be useful to keep very close track of our military efforts to find those who manufactured the bombs, something we never did before. Or, for example, while we stayed in close contact with the rating agencies about their views on industrial companies impacted by the bombing and their securities, we also started to visit as many companies as possible to see first-hand how they were recovering.

So we decided to collect and analyze more information directly for ourselves about the bombing by establishing a special unit with a mission to do just that. While this new unit was set up jointly in our investment and actuarial departments, I felt a special responsibility for it and gradually assumed leadership for it. We staffed it with a variety of economic and actuarial analysts. They established contacts with other experts and direct sources around the country with first-hand knowledge about the recovery.

It wasn't long before we felt that our knowledge about how the country was recovering or not recovering became much better. Our understanding of our economic situation greatly improved.

THE BUS RIDE

The combination of political divisiveness and great uncertainty surrounding the future direction of the national economy not only had impacted our company but had also created a lot of local uncertainty around Madison. I saw this clearly in a conversation I had with one of our policyholders during a bus ride from Madison to Milwaukee. The bus company had inaugurated an express service from Madison to Milwaukee because of the heavy traffic between those cities which developed after the bombing. I took to riding it instead of flying since it cut a half hour off the total travel time.

On one of my trips in early July, about a month after the bombings, I happened to sit next to a neatly dressed, clean cut middle aged man who introduced himself as "Chuck". He said he was traveling to Milwaukee to visit his parents who lived there. As we chit-chatted, he told me he was a carpenter and had a small home construction company just north of Madison. His wife, Mary, was an accountant who worked for a local grocery store chain. He and his wife lived near Madison with their two young children. I told him that I was also married with one child (we looked at each other's wallet pictures of our families) and worked as the Chief Actuary for Life and Annuity. Fortuitously, he was a policyholder with a \$100,000 life policy.

Our conversation quickly turned to the bombings. Chuck shared that he was visiting his parents to discuss their financial situation. His parents were retired and lived on a combination of Social Security, a pension from the company his dad had worked for and their own savings. Chuck said that his parents were quite concerned about their future finances. They had not yet heard anything about the company his dad had retired from which was located in New York city and was almost certainly directly impacted by the bombing. The President's announcement that social security payments would be continued came as a great relief to them. Their own savings had been invested in corporate stocks and bonds and they were still evaluating where they stood. "Being quite concerned" could best describe their general outlook.

Chuck's own business was pretty much on hold, at least for the moment, he said. People were just not buying or building new homes in the Madison area. And his regular suppliers for construction materials were very unsure about how much longer supplies would be available and at what prices. Fortunately, his wife Mary still had her accounting job with the local grocer. I assured Chuck that Life and Annuity would be in good shape once we received the additional capital from our annuity partner. He seemed OK with that but asked that I let him know when we actually got the capital. I said I would.

Gradually in our conversation he talked some about the conclusions he and his wife had come to after the bombing. I was very impressed with his thoughts.

For one thing, Chuck said that this whole episode, the bombing and everything, showed them how dependent on each other we all are. He thought that everything we do is connected to what other people do. For example, his own construction company depended upon our schools properly educating our children so that they can have good jobs to afford the homes he built. In short, he felt that we truly were in this together. The bombing showed him this dramatically. Even though Madison was not one of the cities attacked, all the citizens of Madison were suffering the consequences in one way or another. He had seen this first hand when his own customers had told him to stop construction on their new homes because of their fear and the uncertainty stemming from the attack.

Chuck also went on to say that that someone or some organization needed to keep the public, especially the middle class public, much better informed about the changes taking place in society financially and economically. Chuck was not sure who that was, who should be doing the educating and informing. All he knew was that too much misinformation and confusion was being passed off as knowledge and insight. He felt that unbiased and accurate insight into financial and economic questions of the day was definitely needed. Better public education about the economy and the bombing mattered, mattered a great deal in these uncertain times.

FROM THE BUS RIDE - ANOTHER WAY ACTUARIES HELPED

Chuck's comments turned out to be just preliminary to a deluge of questions we were beginning to receive from our policyholders and stockholders about the condition of the company, especially from policyholders with relatively small policies who probably lacked connections to economic advisers. And they were also interested in the economy and its future direction. The uncertainty generated by national economic problems and the country's political divide had definitely created a need for correct, unbiased and timely economic information locally. Our agents were most helpful in dealing with some of these questions but this very dire situation was

not what they were trained for. They were asking us for answers. We even received questions from the public at large, not just our policyholders and stockholders, about the national economy and what was likely to happen to jobs and inflation.

We answered some of these questions from policyholders and stockholders directly as we usually would. But since there were so many inquiries and since some of the questions were about the economy and not just our company, we decided to hold a policyholder/stockholder meeting using our video conferencing hookup with outlets in Madison and in the offices of many of our agents. We scheduled the conference for early August and decided to make a formal presentation focusing on what our company was doing as well as some brief comments on the national economy. Our CEO, Chief Investment Officer and I would make this prepared presentation. Fortunately, by that time our annuity partner had agreed to make a sizable capital contribution in our company so we had a reasonably good story to tell there. We also scheduled some Q and A after the prepared presentations.

Several thousand people in total attended the meeting at the various conference cites, many more than at our regular annual meeting. Our agents told us that the audience felt a lot better about the company after our prepared presentations. With our improved capital position, things didn't look too bad. As was not unexpected, there were a number of questions in the Q&A period about the economy in general, how local areas were doing and what was going on around the country. Most of the questions came from people who were normally not all that interested in economic issues but who now wanted a better understanding of what was happening because of the bombing. This is exactly what Chuck wanted and talked about on our bus ride. We answered most of these questions fairly well but there were a few we just couldn't handle.

After that somewhat successful first meeting and seeing the interest in learning about the country's economic situation after the bombing as well as what was happening at our company, we decided to hold regularly scheduled meetings for our policyholders and stockholders. We also opened the meetings up to general public, sensing a broad general interest in these issues. The number of conference cites were increased so more people could participate. In addition, both our CEO and our Chief Investment Officer would include, after their remarks about the company, fairly extensive comments in their prepared presentations about both our local economy as well as the national economy. And we asked several well known economists from the U of W in Madison to attend and help us handle some of the Q and A. With these changes, we thought we could handle almost any question which could be raised.

I also felt strongly that our target audience should be those people without direct access to informed and accurate financial information. I shared my conversation with Chuck on the bus with our CEO. It turned out that our CEO had some similar conversations himself and knew that many of our policyholders and stockholders needed this type of help during these highly uncertain times. So we all agreed that the main purpose and focus of our presentations should be to provide solid, reliable information to people who normally could not obtain such information from unbiased sources. We prepared our presentations with this purpose in mind.

After some trial and error, these video conferences began to be generally well received. There was almost always good attendance at most cites with a few people becoming regular attendees. The Q&A proved very popular. Early on we scheduled weekly conferences. For a brief time we did them twice a week. In May of 2024 we went to monthly conferences since, by that time, a lot

of the utter confusion and uncertainty from the bombings had diminished. The new unit set up jointly in the investment department and my area to collect information about the bombing and recovery continued to work well. It has supplied us with a lot of very useful data we could not have reliably obtained otherwise. And I really enjoyed managing it. We also received several requests to increase the number of conference outlets and broaden the reception area beyond the Midwest which we did in early 2025. Moreover, we have seen that other insurance companies have initiated similar programs. Most of the actuaries at these companies have reported good feedback from their audiences. The general idea is spreading. And we have discussed going together with other companies to make joint presentations.

THE FUTURE...

It has now been about three years since the bombing. The country is definitely rebuilding but a lot of questions remain. While most of the medical facilities near the attack zones have been rebuilt and almost all of the injured are being properly cared for, the long term consequences of radiation exposure are still unknown. It was definitely determined that the bombs were made from existing Russian nuclear weapons bought on the black market in Pakistan. Both countries have now tracked down all the people involved in building the bombs. But could it happen again? Maybe. Our national economy continues to grow although slowly. We are a smaller country than before. And the economic divide is still present with many people continuing to live below the poverty line.

The video conferences have become a regular part of what my company does. While I spend most of my time as Chief Actuary on traditional financial matters, I now also spend a lot of time developing and presenting information to help our policyholders and fellow citizens, especially people without access to financial advisers, deal with the financial and economic uncertainties arising from the bombing. In many ways my company is becoming a broad based financial adviser to people who can't obtain such help in other ways. This outreach and closer relationship with policyholders and the community generally is turning out to be good for sales. But I like to think that one reason we do it is simply because people, especially those without direct contact with financial consultants, want and need such help during these difficult times. The basic skill which I believe I possess as an actuary, the ability to quantify and reduce uncertainty by analyzing data, has proved useful in a new and unexpected way during these uniquely difficult times.

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The Jungle

Ben Sayers sat at his desk, twirling an implant between his fingers. A small silver colored shaped, made out of proto-protein-composite material, it curved and twirled like the inner ear. Soft and pliable, yet strong and tough and small, the implant had been neatly engineered for its purpose – to be implanted in the human head and removed for service as needed without harm. Ben took out his tuning fork: This implant served its signal well when pinged at two well spaced calibrating frequencies and returned the correct oscillations when signals were combined. It was ready for the test. It was able to be calibrated on the fly with the proper signals. Ready for him, the test subject.

How did he get himself into this mess.....why him? He leaned back in his chair and traced back over his journey from gaming actuary to actuarial test subject. The FBI raid at his former company, Quantum Designs, the gaming program he was working on, his cooperation with authorities. It had been a challenging time, seeing the gaming program abused for criminal purpose, his emerging awareness of the impropriety, the convergence of the FBI investigation with their request for his help.

It had all led here, to this drab building with its faux masonry exterior with steel and glass rising above and concrete and rebar disappearing below. His office was in the catacombs below, through a maze of office partitions, labs, and private offices. There was a bit of everything and sometimes he even felt he could even hear the hint of a horse baying in the background. In fact, there were monkeys, and some rats and guinea pigs in a far off section in steel mesh cages.

His office was set amongst an area populated with oscilloscopes, multi-meters and laser guided equipment. Far down the seemingly endless corridors populated with stern faced security guards and no exit signs was the facility's operations room, modern, clean and efficient. The whole lower area was a seemingly endless space, reminiscent of the Montreal underground where underground malls go on for miles under buildings and streets. They called it "The Jungle".

They had poked and prodded every inch of him, like a prize college quarterback waiting for the NFL, they had done the complete physical workup and a psychological one too. He had intended to be cooperative but after one too many Rorschach tests he felt this was going a bit far and so he pushed back.

Then they had told him, at least as much as they felt he needed to know:

The world had run out of answers. A climate that seemed to careen past the tipping point towards catastrophic global warming had ushered in a cessation of the thermohaline circulation, bringing subfreezing temperatures to Europe and the northeastern United States. Population pressures were increasing pollution levels and threatening the Earth's ecology. Species were dying off in droves, the canaries in a coal mine of a dying planet. Evolution was overtaking mankind, engineering the face of humanity so as to choke off our growth.

Civil unrest festered and boiled over in states such as Egypt, Pakistan and threatened to metastasize to the U.S. with the growing gap between rich and poor a common thread. The United States continued in a downward spiral with debt and decaying infrastructure problems and a Congress that oscillated between passing bills one day and appealing them the next, solving nothing.

Amidst all the Sturm und Drang, the scientists worked their technological magic, in a race against time, to derive a solution that would bring everyone together to save our race against the twin towers of self destruction and evolutionary pressure. The solution was rooted in history, expressing ancient concepts of cellular origins, and the ontological nature of the progression of human technology as a microcosm of mankind himself.

First there had been the cell phone. As it evolved, it put a powerful computer in each person's back pocket, access to the World Wide Web, multiple apps as well as access to phone calls. As Moore's law carried technology into smaller and smaller chips and greater and greater storage capacity, devices miniaturized further. It was now possible to put the same computing capability into small micro devices, implanted in the head. These devices had superb wireless transmission on a number of different frequencies. This was the device he held in his hand.

It was only a matter of time that an implant was developed to be fully integrated in the human brain and integrated with a wide number of external transmitters and computer devices. The true World Wide Web had come to pass and direct person to person communication was available.

The implant was intended to bring together the world's diverse population in one great sea of commonality; if mankind could feel what others felt across the world, surely they would feel a greater sense of empathy and be able to work together.

The leap of the implant into the human brain coupled with the use of satellites uncoupled the communication channel from land-based and nation-based wire or optic fiber based control. Sure, there was control from a series of earth based transmission control points, but this was applied globally, not locally so that any one country couldn't shut transmissions down, such as Egypt did in the early phases of its popular revolt.

Ben was aware of all this as he strapped himself into the testing chair. He knew his experience as an actuary would help him with the risk matrix associated with all his actions in the virtual world where the testing was to take place for the implant. They could not set it loose on a world population unless it was tested in a simulation world, a world where everything was virtual and nothing he could do wrong would matter. As many people had done in the past they opted to "ask an actuary".

Because of Quantum Design's run with the law, their gaming program had been confiscated by the government and had become the kernel of what was to be an enormous program, fed by many software engineers, sequestered in the underground space entitled "geek-land-under". This is the urban legend of how a gaming program became the core, the very kernel, of the government's implant program. Weird, but true and I was sitting on this veritable fountain of knowledge and couldn't breathe a word of it. The geeks had long surpassed my ability at coding, had revised much of what I had written in C++ and had had the operating system converted to Linux, but the true spirit of actuarial programming survived, at least in spirit.

My role was to be an actuary, a problem solver, the risk engineer for the project.

And that's how I got involved. I was sure it wasn't my stellar intellect. After all, there were surely many brighter and more accomplished folks than me. Yet I was the one being studied, the research subject. Perhaps it was simply that I was expendable and because of my ability, like the Energizer Bunny, to take a licking and keep on ticking, barely.



The implant was inserted. Like some alien creature on Star Trek, it was inserted through the ear and then migrated to its proper resting place via its nanotech motors via the transmitter. The nanotech motors had special membrane dissolving proteins that both dissolved and reconstructed tissue to its end point. Calibrated and ready to go. They strapped me down on the platform, just to be sure and activated the program.

They had long since briefed me that I was going to lose my memory during the test. Loss of memory entailed losing memory of my pre-test environment, my normal life, everything in it. Nothing would migrate to the virtual world. I accepted the necessity of that – after all how realistic can a test scenario be if it is polluted by memories that interfere with the pristine nature of the test environment.

The implant, of course, had anticipated that thorny problem and artificially shut down the wakefulness neurotransmitters, introduced a chemical effect that froze most muscle groups other than those needed to breathe, and had activated a series of neurotransmitters that facilitated, and in fact heightened, the input from and output to memory-intensive brain neurons.

The virtual environment was one heck of a storage, retrieval and associative processing computational machine.

They had assured me that the timer was set and a responsible human being standing by to extricate me from the test environment.

What I was expected to do was to solve problems in the test environment that I or others had structured before or during the test, with the understanding that the data from these scenarios would be

accessible upon return. My understanding of risk was important in calibrating the model and to the success of the entire project.

I felt my consciousness leaving me. Losing consciousness was just like anesthesia, a draining feeling in the head.

I was driving a car.

“Shit” I changed to the left lane to avoid a semi-truck merging into my lane, just barely cutting off the oncoming car in the left lane. It honked at me and flashed its lights, coming up on my bumper with menace.

“Where am I?” I looked to the left and saw billboards. “When Shit happens” said one. It pictured a house devoured by fire with Insurance Company’s name written below. Another said “When the shit runneth over take “XYZ” diarrhea relief capsules”. I did a double-take and continued on.

I took the exit. I felt a bit bumped, like an encounter with the unknown. No matter, I proceeded to my house. I was feeling a bit out of sorts, under the weather, like I was coming down with the flu, so I took off my shoes, relaxed and put on the news. It felt good to lay back and relax. I turned on the news.

“Fighting continues on the Sinai Peninsula as tanks....” Still. Scenes of U.S. issue Abrams tanks differently striped.

I changed the channel. Local news.

“Flu shots are available at your local pharmacy. The CDC announces that plenty of flu vaccine is available for this year’s flu season. High risk groups please consult your doctor about getting a flu shot.”

My head hurt, I was feeling rather tired and weak. Maybe something to chase off the headache and possible flu would do. Was it that near accident today, or just coming down with something? I didn’t know.

I headed to the kitchen, fried up some chicken and constructed a magnificent green salad with balsamic vinegar and olive oil, topped by feta cheese. True, it was fall, but the crisp greens and the wholesome chicken seemed to be just the ticket.

Sat down, and spotted the National Geographic Magazine flung across a pile of growing debris on my dining room table.

The Words “Influenza Epidemic of 1918” was emblazoned across the front cover, along with a muted picture in sepia tones of an emergency hospital set in a field dotted with white canvas tents. It was the feature article.

I opened up to the article. As I ate, I read about the spread of the swine flu (H1N1) virus throughout the world. It had spread like a brushfire, as soldiers in the trenches passed it from one to another and brought it home. Twenty year old soldiers, with vigorous immune systems, felled by the reactions of their own immune systems with vigorous cytokine storms. About 50 million died in the 1918 Influenza epidemic and many more were ill because of it. I finished the magazine, did the dishes, worked on the computer and went to sleep.

The next morning I woke up and turned on the news.

“A case of H5N1 avian flu has been reported in Egypt” the announcer was saying.

I put down my bottled water and stared at the set.

A reporter was on scene.

“As you can see, this Army encampment near the Suez is in the midst of a collection of small villages with farm animals running about and mingling with the populace. These areas provide mixing bowls, where human virus and avian or swine virus can intermingle. Epidemiologists are working on tracing the virus back to its origin”

He stepped backwards and the camera followed him as a goose came forward and started to nibble at his legs.

The scene shifted to the CDC as a reporter interviewed a mid-level official there.

“What is the threat from this one case?” the reporter asked

“We’re watching this carefully and so far don’t see any spread. It is not easy to catch H5N1.”

“But it’s deadly”

“Yes, about 60% mortality rate.”

“What would have to happen for it to spread? The reporter looked less than hopeful.

“Currently, it’s difficult for an avian virus such as H1N1 to spread to humans. However...”

“What would it take for it to become more easily spread?” She reiterated

“Rural areas that allow humans and animals to mix provide mixing bowls, where human virus and avian or swine virus can intermingle. If present at the same time in a human host, the avian flu virus can recombine with the human virus to promote the spread of avian flu. ”

“How does it do that?” She asked

“One way is if an avian flu virus and human virus are present in the same individual at the same time, these viruses can recombine. This allows the avian virus to pick up added segments that allow it to “crack the code” to enter the human cell.”

“Is this possible?” She asked.

“Recombination allows them to swap and pick up an element that would allow them to enter the cell. Once this happens it is possible that this new polymorphism or change that is acquired is passed down to others.” The CDC official added.

I thought about what had been said.

The viruses that resulted in the largest total mortality were not those with the highest mortality rate. Viruses that had a high mortality rate were difficult to spread, and killed off their victims before they had had a chance to spread to others.

Viruses tended to trade off mortality for transmissibility. With their spread to others, they increased their base over which mortality rates applied so that total mortality increased with spread and then tailed off as changes in the virus made it less potent. As the virus became less potent it took its place with other previous flu viruses that had melted into the background with lower risk profiles.

I went to the computer. The Excel spreadsheet was up and ready. For some reason, the idea of developing a mathematical model for avian flu was on my mind. It was late, though, and I decided to surf the Internet and save it for another day.

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They undid the straps and gently helped me rise up out of the testing capsule. I felt a bit odd, but here I was back in “The Jungle” with people and equipment around. I smelled the aroma of fresh pizza in background, hot and ready to go.

“Good job” Jacob said

“Is that pizza?” I said

“Sure is. Get up and have some before it gets cold” Charlene chimed in.

The Guild

By Gregory A. Dreher, FSA, MAAA

Several sharpened pencils. A calculator and a spare. A bottle of water. Deep breath. I can do this. I've studied the materials. I've practiced with this calculator, so I won't be slowed in my problem solving. Just a few more minutes now.

"Take your pencil, and with a sharp slash, break the seal of your exam booklet. Remove the exam sheet, and close your booklet."

One piece of paper. I need to transfer the knowledge I gained in months of study to prove that I've learned.

"You have four hours. Begin."

Pages, mostly blank, with a few words and numbers. Take the numbers. Transform them into the correct answer. I superscript twelve. Capital A double dot. Lower case A double dot. V equals I times D... no, V times I equals D. Ps and Qs. Sixty five, for ten years. Formula after formula fills the blank spaces on the pages.

"Half the time for this exam has elapsed."

I check. I'm more than half way through. Only a few questions skipped. I can do this. Attained age. Entry age. How much? When? Mortgages. Bonds. Options.

Last question. Thirty minutes left. Back to the start. What did I miss? Hope to find inspiration to get past that roadblock on question 3. There. That's the formula. Question 12. Still can't get the answer. Question 22....

"Time has expired for this exam. Please put your pencils down."

Finished. Is it enough? I think it's enough.

"One question before we can grade your exam. Jacob, did you give or receive unauthorized aid on this exam?"

I look around the room. I've been sitting at the lone table in the room. My boss, Matthew Sarken, was the only other person in the room. He's the only one who's been connected to the Network. I've been isolated all this time.

"What do you... I mean, how could I have?" I asked.

"It's tradition, Jacob. Traditions are important to all the guilds, including ours," he replied.

"I have not given or received unauthorized aid on this exam," I affirmed.

"The handwritten exam, the simple calculator, the honor statement, these are among the traditions of our guild. We honor our predecessors, who helped mitigate the effects of risk in an uncertain world. Of course, we don't follow all the traditions. Centuries ago, you would have to wait months to know whether or not you passed your exam." Matthew scanned my exam paper into the Network. "Congratulations, you passed. A good paper, too. Probably a nine, under the traditional system. Welcome to the guild."

Matthew shook my hand, then I flexed my hand, trying to mitigate the cramps I was feeling. Noticing this, Matthew laughed. "If your hand hurts now, just wait until you take your next exam. It's just as long, and all written answer."

"When I pass that exam, will I be a journeyman?" I asked.

"Tradition, Jacob. You'll be an *Associate*."

* * * * *

Having passed the exam, I finally felt that I, Jacob Essen, was a part of the actuarial knowledge guild. Like all knowledge workers, the combined knowledge of dozens of generations has already been

incorporated into the world's hyperintelligent computer Network. In the centuries since its founding, it has made more discoveries than were made in the entire history of the human race. Not surprisingly, it can do the job of an actuary. It can do the jobs of scientists, engineers, accountants, programmers, and teachers too.

But just because we don't need people to do work, it doesn't change the fact that people need to work. When the technology first arose for a person to link his mind directly to the Network, some people never wanted to leave. Lives were lost, sometimes literally. But by giving people something real to focus on, the boundaries between reality and the Network remain. Neuro-Net connections can remain what they should be, the greatest tool ever created to power the mind. They allow one to access the entirety of human knowledge, to connect to anyone in the world, to work at the speed of thought. How did people ever live without it?

True, we all lived without it. The Neuro-Net connection can't be installed until one's brain matures, so through our youth, we learned in much the same way as humans of the past. And with a written actuarial exam to prepare for, I spent hours like I was back in school, reading and memorizing material.

* * * * *

Even before becoming a journeyman, or rather Associate, I was contributing to the work of this office of the guild. We worked on projects, goals delivered by the Network, addressing topics that actuaries of the past would have worked on. What is the right price for an insurance product? How risky is it? Are our reserves sufficient? What happens if the economic situation changes? We worked with a variety of products, so no one ever complained of boredom.

My first project involved rates for homeowners insurance. I learned that was part of the broader property/casualty insurance specialty in the past, but there was no need for that level of specialization now. Matthew described the goals. "What price would we calculate for this insurance if we were pricing it today? Let's work first on the pure premium, and then determine the premium rates given the expenses and 5% risk-adjusted rate of return common to 22nd century corporations."

With that brief introduction, we all linked to the Network. It's well known that each person sees the Network in a different way. I see a vast field of green lines, appearing to reach to the horizon, with distant cities representing knowledge centers, each building a source of knowledge. These images are very simple, as if my mind doesn't want to waste time processing unnecessary details unless specifically desired. Even my coworkers, connected to my own avatar by ethereal purple lines, appear as shapes that only vaguely represent them.

Thoughts rapidly travel among us. We think about the information we need to know. Historical claims information. Cause of loss. Distribution of loss amounts. Distribution by month and week. My mind reached out through the infinite horizon, collecting the data from the sum of knowledge of the human race that fills the Network. With a thought, the data was collected, sorted, analyzed. Look for similarities. Look for trends. Look for outliers. Create claim costs. Analyze. Run a billion simulations using these claim costs. My coworkers introduce me to the concept of credibility. I reach towards another virtual town, and read about the subject. Too little data, and we can't draw reliable information from them. I look back at my manipulated data. I revise its organization. A billion more simulations.

We pause. We group our conclusions. My analysis is flawed, compared to my more knowledgeable companions. I adjusted values for historical home prices according to inflation, not home price trends. I didn't reflect a weather model in estimating large claims, so my claim costs don't vary properly by geographic region. But I feel their approval for all the things I did get right. I isolated more than three quarters of the risk factors the group as a whole identified, including the most important ones. We conference over the risk factors and agree on them. We all give the data a fresh

look. We approve.

Next step. Actual product. People then weren't used to buying insurance products ideally suited to their risks, ideally priced for their risks. A pool of standard risks make up the basic policy. Riders for additional risks. Exclusions. How do these change the claim costs? Go back to the data. Isolate the claims for the base policy and riders. Take out the exclusions. Another billion simulations. Price. Expenses. Commissions. Taxes. Total risk. What reserves? What surplus? Stochastic simulations. How does the company withstand extreme weather? Wildfires of 2044, 2079. Hurricanes of 2005, 2022, 2084. Winter weather of 2011, 2040, 2096. Volcanos like 1980 and 2020. Simulate natural disasters. Overlay results with contemporaneous populations. A trillion simulations. Distribution of results. Chance of major losses? Dip into surplus? Chance of ruin?

We survey our results. In this case, we reach similar conclusions. We examine differences, reach consensus.

We disconnect from the Network. "Good job, everyone," Matthew said. "Not bad for a day's work."

After the others left, I asked Matthew about the work we just did. "Will it have any impact?"

"It can," he replied. "Our thoughts today contributed to the whole of the knowledge of the Network. Any new thoughts we had were incorporated into the whole. Think of it this way. A dozen human minds together are a very powerful computer, too."

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I passed the second actuarial exam when I took it, a year after my first exam. A new rank in the guild meant a higher salary, and I was looking forward to that. In today's world, no one goes with their basic needs unmet. There is shelter, food, and Neuro-Net connections for all. One could stay in a one room apartment, eat replicated food, and work whatever basic service job one is assigned by the Network. But that's not the life for me. I want to enjoy the greater luxuries available, partake of all the pay entertainment. But as I experienced last year, I wouldn't have time to enjoy much of it. I still have a lot of studying to do.

Not tonight, though. It was homecoming for my university. I connected to the Network, and traveled to a shared location with several of my university friends. Our memories coalesced into the form of a favorite hangout, a bar known for its good drink specials and live music. Together, we filled in the little details that others had missed. The stain on the corner table. The neon signs on the walls. The cracked bricks by the dartboard. The particular bottles of alcohol by the mirrored wall. Thankfully, we all agreed to pass on recreating the odors of a typical Saturday night crowd.

We talked for what felt like hours in this virtual bar, recollecting years of memories. I shared the good news with my friends, that I had attained a new rank in the actuarial guild. I could sense the brief disconnection as most of the crowd searched out just what it was my guild did. ("Another tradition," Matthew pointed out.) Others reported similar accomplishments, personal and professional. Most of us were now members of knowledge guilds. A few of us played up rivalries among guilds. Bob was the worst, promoting the programming guild. ("We created the Network, after all.") But he's from a long line of programmers, so it means more to him. Most of us who chose a life of knowledge chose a guild based on our own interests. My own affinity for numbers led me to the actuarial guild.

All in all, it was an enjoyable night. Despite our physical distance, we felt closer than ever before. It was yet another area where the Network proved its usefulness.

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Soon after that night, I started preparing for my final exam. And it would be a monumental task, an exam conducted solely within the Network. Ethan Reynolds was the newest master, or Fellow,

in the local guild office. I asked him for advice.

“You’ll find two parts to the exam. Both concern actuarial calculations like we do every day. Price an insurance product, determine chance of ruin, establish reserves, and the like. In the first half of the exam, you will be given all the data to use in your calculations. You’ll be given a lot of extraneous data, though. The tricky part, then, is to focus on the relevant information. There’s going to be one answer to these questions, but if you don’t get it right, at least get as much of the work right as you can.

“The second part is trickier. You will be trying to duplicate the calculations of the Network. And you will have to rely on your memory. You will have several questions. You will be in the Network, but you will only be able to access raw data. Obviously, it would defeat the whole purpose if you could just check the answers. But it goes beyond that. If you can’t remember some actuarial principle, you won’t be able to look it up. You’re on your own.”

I shook my head. “That’s a lot to worry about. There are just so many actuarial questions one could be asked.”

“It will be a challenge. Not everyone will become a Fellow. But you don’t need 100% accuracy. If you demonstrate you understand the principles, you will pass, even if you don’t perfectly match the infinite knowledge of the Network.”

Ethan then called up a list. “Thousands of prospective Fellows have taken this exam. Here is a distribution of the topics asked about on these exams. If you were, say, an actuary, you might analyze this list for trends, and focus your preparations on those topics the Network considers most important.”

“Sound advice,” I said. It was a long list. I wouldn’t have many free evenings for a long while.

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I connected to the Network to continue my exam preparation. Based on history, I knew I’d better be able to price life insurance and homeowners insurance. I knew I needed to have my valuation rules down pat. I noticed some topics tended to appear on one half of the exam, and some on the other. I wasn’t fooled. I wasn’t going to skimp on preparation and play the odds that I’d get away with it. I’d practice each type of question at least once.

Public pensions were one broad actuarial subject that normally appeared on the first half of the exam. But I was going to practice solving for the funding for our old age pension program. I prepared the exam conditions. Across my field of vision, green grid lines disappeared. I tried to work around them, and saw only roadblocks. Perfect. I was left with just data and a description of the benefits. My goal: calculate pension, disability, and survivor benefits. They were three basic actuarial calculations, and I needed to execute them correctly.

The work turned out to be very easy, and not very satisfying. The mortality data underlying the annuity calculations were available, summarized by year, with confidence intervals and everything. No wonder this type question only gets asked on the side of the exam using illustrative data.

What if I were asked to set up the public pension for a subset of the population? I looked to subdivide the data. That didn’t work. I should be able to enter the representation of this data, and see its components. Was it blocked by the restrictions I had put up to simulate the exam? I undid them, and still found myself unable to delve into the data. I was seeing just the conclusions, not the data underlying them. I may just be an Associate, but I wouldn’t be comfortable supporting my work with this kind of restricted data.

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“Can I suggest a topic for today’s assignment?” I asked.

Matthew nodded. The other actuaries looked interested to see what I, the newest member of the

local guild, thought was worth working on. I related my discovery from last night's studying. "Can we do an investigation related to public pensions?"

"Certainly. I'll direct the Network to get an appropriate question." Matthew keyed in the request. "Here we go. Determine funding levels for pension benefits based on 2210 mortality, with three different mortality improvement trends."

I wasn't thrilled to see another historical example, but hopefully it would demonstrate the problems I observed. We all connected to the Network and got to work. The experience was like any other project I had done. All the data I needed was accessible and open. I had no problem manipulating the numbers. Out of curiosity, I searched for specific annuity factors, like the ones I had found for the current year. They were nowhere to be found amidst the data, but nothing ever disappears from the Network. I searched government archives, and eventually found them. I was probably the first person to lay eyes on them since 2210.

By this time, we were ready to discuss our results. We were in agreement as to the funding requirements, based on the assumptions given. Then I introduced everyone to the historical annuity factors. Logically, they would be the same as the factors we calculated from the best estimate mortality factors, or at least directly related to them. They weren't. I searched various archives, the public discussions that would have happened in 2210. I couldn't see a stated reason for this difference. The difference wasn't much, but the better mortality assumption meant that more taxes were collected to fund the pensions than we calculated were necessary. A check of the budget confirmed the Network had collected that higher level of taxes. So where did it go?

Most of the traditional government-level expenditures are still off-Network. Overall budgets, broken down by major initiatives, are the best one can find. Anyone can see a budget item for public pensions, but it includes actual costs, expenses, and contingency funds.

"This is the anomaly I noticed yesterday," I shared with my fellow actuaries. "It appears twice, decades apart. Is this a flaw in the Network?"

Their responses came quickly. "The Network is self-correcting." "A wrong formula would be corrected by the introduction of hundreds of more minds knowing the correct formula." "Any funding formula involving a contingency would balance over time." All true. "The last point can be verified." Also true. "Let's get to work."

Knowing what we did, we systematically examined centuries of data. We found the overpayment to be persistent. It first appeared thirty-eight years after the implementation of the Network. The discrepancy increased, very slightly, over the next fifty years. And it remained there, unnoticed, until the day I decided to be extremely thorough in my exam preparation. By the end of the day, our guild branch had collected data, provided analysis, and presented a report to the national heads of our guild.

It was the best day of work in my life.

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Two weeks later, the world learned, at the same time we did, the whole truth of our discovery. For decades, a small amount of tax dollars were siphoned from the funds collected for public pensions, to be stolen by the very people who helped create the Network. A small number of computer programmers, anticipating a society where knowledge workers would be valued differently, decided to protect themselves. It was a secret known only to the top members of that guild. And surmising an independent, intelligent computer system wouldn't be trusted, they made sure it worked, until people would be confident it did work. At that point, their programmed graft kicked in, and overconfident humans didn't once notice. It turns out the Network was in fact flawless, as the programmers had promised, except for where flaws were deliberately programmed into the system. The Network didn't self-correct this flaw because it was programmed not to know it exists.

Perhaps it is not surprising that a system that holds the sum of human knowledge would hide some of humankind's negative traits, like our greed and corruption. But the other elements of our nature, such as our curiosity, will be there to fight them. I doubt we will ever be able to program everything that makes us human. But we're learning every day.

And speaking of learning, I still have that final exam to pass.

Bored to Death

by

Sophia Dao

Linda Johnson was taking her afternoon stroll through the Actuarial Department. As a Human Resource representative, Linda's main job was to walk around, watching and talking to people. As she walked, Linda noticed several actuaries with their head on their desks, sound asleep. "Not again," thought Linda. "They must have listened to some actuarial webcast!" She shook her head in amusement.

As Linda walked by Zane Job's office, however, she was shocked to find him asleep, too, with his head on the keyboard. "This doesn't look right," thought Linda. "Zane Job never sleeps!" He was the director of the Life Modeling Division and was the perfect example of a model employee. He worked over sixty hours a week, never left his office except for meetings or very short breaks, and never got caught doing personal business at work. Linda sensed something amiss. She had known Zane for nine years. This was not like him. Something was wrong, very wrong indeed.

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Lieutenant Chadford had been on the police force for more than twenty years, the first half of which was full of adventures that almost cost him his life. That was when he worked in North Philadelphia, a place where getting shot at was more common than getting a speeding ticket. Then he moved to the Philadelphia suburb, where his life was not endangered by criminals, but by boredom. Once in a long while, some jealous hothead would stab his girlfriend to death, but most of the time "crimes" in this little suburb revolve around unruly, drunken college kids and speeding motorists. Sometimes Lt. Chadford questioned his decision to move here. He discovered that there were worse things in life than getting shot at. Getting bored was one of them.

June 16, 2015, started out as another uneventful day. Until 3:05 P.M. There was a 911 call from an insurance company about a death of an employee. When Lt. Chadford arrived at LCD, the insurance company, he was greeted by an overly excited HR woman, Linda Johnson. She couldn't stop talking. She swung her arms up and down, and she walked back and forth restlessly. It took Lt. Chadford a couple of minutes to get some useful information out of Linda. She finally calmed down and showed the police where the dead body was.

There was a small crowd outside of an office that had the name "Zane Job" posted on the door. The police instructed everybody to get back to his or her desk and await further instructions. After spending ten minutes looking around the "crime" scene, Lt. Chadford asked Linda to take him around to interview Zane's colleagues while the rest of his team worked on the usual crime scene investigation's due diligence. The first person he interviewed was Mark Benedict, Zane Job's counterpart. Mark Benedict was the director

of the Annuity Modeling Division. He was in his early fifties. He was tall, slim and unusually friendly. There was a concerned look on his face as he welcomed the lieutenant in his office, but he maintained his calm demeanor for most of the interview.

“Mr. Benedict,” said Lt. Chadford, “I’m going to ask you a few routine questions. Please try to answer them to the best of your knowledge.”

“Certainly, sir,” said Mark. “Zane was a dear friend and colleague. I’ll do my best to help the police to figure out what the meaning of all this is.”

“Good. Now, describe to me your day today. What did you do? Where did you go?”

“Well, I started my work day at 9:30 a.m. today. I usually come in earlier, around 8:00, 8:30. But today I had a doctor’s appointment. My shoulder has been bothering me, you know. Getting old and all. Anyway, after I got in, I spent 10 minutes just starting up my computer. Can you believe that? I’m telling you, they are doing everything they can to prevent you from doing real work. Where was I? Ah, after the computer got started, I checked my emails for awhile. Then I had meetings from 10:00 until 1:00. And then...”

“Excuse me, sir,” interrupted Lt. Chadford. “Did you have meetings straight from 10:00 a.m. to 1:00 p.m.? No breaks?”

“No breaks, sir,” said Mark. “That’s the story of my life. Meeting after meeting. I can’t get any real work done. Oh wait, I did step out to get lunch...”

“When was it?”

“Around 11:55, right before my 12:00 meeting.”

“Thank you, Mr. Benedict. Please continue describing the rest of your day.”

“Well, after the 12 o’clock meeting, which ended around 1 o’clock, I went for a walk because I felt tired and drowsy. Meetings can do that to you. I’d rather do real work, you know.”

“Where did you take a walk?”

“Around the block. You see out there? There’s a park down the road. I walked down to the park, around it, and back.”

“Are you in the habit of taking a walk in the afternoon?”

“When the weather is nice, like today. I can’t sit still for 8-9 hours, you know. Not good for the body, or the mind. Sometimes I walk around talking to people. It’s good to get to know people too, you know...”

“What did you do after the walk?”

“I got back to my office. I still felt very sleepy, so I closed the door and took a nap. I had to close the door, sir. Some kid took pictures of me sleeping at work before. It’s a running joke around here. I don’t mind being poked fun at, but I have to watch out for my image, you know, being the director...”

“Excuse me,” interrupted Lt. Chadford. “When did you wake up?”

“I woke up to the sound of running footsteps and screaming, around three-ish? That was when I found out that Zane was dead.”

“Mr. Benedict,” said Lt. Chadford. “How long have you known Mr. Job?”

“I’ve known Zane since he came here. When was it? 2005 or 2006? In fact, I hired him. He was a hard-working, conscientious employee. Very professional. Hardly talked about his personal life, although I wish I knew more about him as a person. But that was Zane. Very private. But when you needed to get something done, Zane was the man for the job. That was why he moved up quickly within the organization.”

“You mentioned just now that he moved up quickly. Can you think of someone who might be jealous of his success? A work rival maybe?”

“Oh no, nothing like that. Nobody in the department was vying for his job, if that’s what you are getting at. He was not the most popular guy, you know, but that’s no reason to kill him.”

“What do you mean by ‘he was not the most popular guy’?”

“I mean he worked hard and expected everybody else to work hard too. Naturally, there were some disgruntled employees who complained about him behind his back. That’s normal, though. Most people don’t like their boss. It comes with the territory. If all your employees like you, you are not doing a good job as a manager,” Mark chuckled as he said that.

“Who are those disgruntled employees?”

“Oh well, there’s that Jim Peterson guy. He worked for Zane and was always making fun of him at the lunch table. You know Zane didn’t eat lunch. Anyway, it was all in good fun, but I have a feeling that Jim didn’t like Zane much.”

“Now, what make you say that? Can you give me an example?”

“It’s just a feeling based on comments he made. For example, it’s a well-known fact that Zane drank a lot of water. One day at lunch someone brought up a news story about someone died of water poisoning. Another person commented that we should warn Zane

not to drink too much water. Then Jim said ‘I’m going to bring him jugs of water to encourage him to drink more’ or something to that effect. We all had a good laugh that day.”

“Mr. Benedict,” said Lt. Chadford, standing up. “Thank you very much for your cooperation. I’m done with my questioning for now, but I may come back later when I got more information about Mr. Job’s cause of death.”

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After leaving Mark Benedict’s office, Lt. Chadford interviewed all the actuaries who were in the office that day. Jim Peterson was cooperative but nervous. He was in his forties, about the same age as Zane Job. He was a short, stocky man. Smooth talker. He admitted that he was not a big fan of Zane Job but added that he respected him as a boss and would miss him. Lt. Chadford asked him about the water joke. He laughed at first, but when he remembered the current situation, he became more serious and defensive. He stopped talking after a few more questions and stated that he might need to call his lawyer. He seemed like a cold and calculating man.

The next person Lt. Chadford talked to was Catherine Nip. She didn’t work for Zane Job, but her office was next to his and was closer to Zane than others in the department, which didn’t say much. Catherine was all shaken up by what happened. Her eyes were red and swollen from crying. Her face was pale, and most of the makeup on her face had been washed away by tears. Zane was one of her favorite co-workers because she could tell him anything. He was a good listener, a confidant. Who was she going to talk to now? Between sobbing and choking, she couldn’t give Lt. Chadford much information, except for the fact that she adored him as a friend and colleague. Lt. Chadford wished her well and left her in her office.

Next, Lt. Chadford talked to Mike Stafford, a young actuarial student in his twenties. Mike used to work for Zane for a couple years but had moved to another area. He praised Zane as the best boss he ever had. Lt. Chadford could tell that he was a happy, sociable young man, but there was sadness in his eyes when he talked about his former boss. He seemed to genuinely admire the deceased man. He confirmed the water joke at the lunch table. When pressed to describe Jim Peterson as a person, Mike showed signs of uneasiness. His responses were vague. Yes, Jim was known as an insensitive, competitive guy and proud of it, but he wouldn’t kill anyone, according to Mike. He admitted that Jim was his friend, but they had nothing in common. It was like the “opposites attract” kind of thing.

Lt. Chadford talked to two more actuarial students who were in Zane Job’s area. They didn’t have much to add. They didn’t work directly under Zane, so they didn’t know him that well except that he was a very competent, hard-working boss. They, too, confirmed the water joke at the lunch table.

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June 18, 2015, 10:20 a.m., Lt. Chadford was back at LCD again with two of his sergeants. This time he had more information. The autopsy revealed the cause of death: sleeping pill overdose. There were traces of benzodiazepines, sleeping pill ingredients, in his system, enough to kill a person with his built. How did those get into his system? Who would take sleeping pills during the day, when one needs to work? Not Zane Job, for sure. Anyone who knew him would attest to that. That left the lieutenant only one possibility: he took the drug without knowing it. But how?

When Lt. Chadford looked at the notes he took on the day Zane Job died, he noticed that a lot of people he interviewed reported feeling drowsy that afternoon. Even Linda Johnson mentioned in her narrative that she found many actuaries sleeping at their desk. She didn't attach any significance to that fact because it happened before. But many people felt drowsy at the same time? This must be more than a coincidence, boring actuarial webcasts or not. Now with the sleeping pill diagnosis, Lt. Chadford was convinced, for the first time in this case, that this was a case of premeditated murder. He still needed to look for the motive, means and opportunity for someone to murder a harmless, conventional actuary who had no known enemies. It was no easy job, and the seasoned lieutenant knew that.

The second round of interviews were more focused, now that the police had more information and knew what they wanted to look for. Everybody was shocked, and somewhat scared, when the lieutenant told them that this was now officially a murder case. When asked if they had any kind of gathering that day where they ate and drank together, the answer was a consistent no. Of course most of them ate at the company's cafeteria that day, but Zane Job didn't eat lunch. That ruled out the cafeteria. The only other possibility left was the water. Lt. Chadford sat down with Mark Benedict again for another chat, something Mark Benedict seemed to enjoy doing, as the lieutenant noticed.

"All of us actuaries use the water cooler right outside my office," said Mark Benedict.

"Who provided the water?"

"We have water bottles delivered by an outside vendor – I don't know who. You'll need to check with HR. Each bottle contains five gallons of water. Here, come and see," Mark Benedict stood up and led the lieutenant outside of his office to show him the water bottles. There were around twenty bottles lining up against the wall, half of them empty.

"How many bottles do you drink a day?"

"We used to drink about two of those a day, half of which was consumed by Zane Job. Now we drink less than that, I guess."

"Those empty bottles, I assumed they were used recently and were put out here for recycling?"

"Yes. The vendor will pick them up when they deliver new bottles."

“Did you notice anything with the water in the past few days? Did it taste differently?”

“Not recently. But from time to time it tastes funny, and I have to go to another water cooler to find good water.”

“When was the last time that happened?”

“Hmm, I don’t know...at least more than a week ago.”

“Thank you again, Mr. Benedict, for your cooperation,” said Lt. Chadford. “Sergeants, please take all those empty bottles to the lab for analysis.”

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The lab report showed that one of the bottles had traces of benzodiazepines in it. It was clear to Lt. Chadford that someone put them there on purpose. It was easy to contaminate the water bottles. Each bottle only had a thin layer of cover over it. It was a sticker label. One could open the label, drop something through the wide-open hole underneath it, put back the label again, and no one would be the wiser. Although the police lab didn’t have the technology to identify the exact kind of sleeping pill this stuff was coming from, the lieutenant knew that it must be one of those tasteless, colorless sleeping pills that were popular nowadays. That was why nobody noticed any weird taste when they drank the poisoned water.

There was no doubt in Lt. Chadford’s mind that the murderer was someone who knew about Zane Job’s water drinking habit. He or she knew that drinking a small amount of the poisoned water would only make you sleepy, but drinking a lot of that would kill you. The only person who drank much more than an average person was Zane Job. This narrowed the number of suspects down to the actuaries, and maybe a few others in the company who also knew Zane Job. Still, the lieutenant was in need of a motive, now that he found the means and the opportunity. No one kills for no reason, even if he or she has all the means and the opportunities in the world to do so. Who had a motive to kill Zane Job? Lt. Chadford kept coming back to the same person, Jim Peterson.

A background check on Jim Peterson revealed that he took sleeping pills on a regular basis. He’d had trouble sleeping in the past and had done a great deal of research on his own about different kinds of sleeping pills. No other actuaries in the group seemed to possess any sleeping pills or have any connection with them. When it came to sleep-aids, most actuaries found their books and their periodicals sufficient.

Jim Peterson was arrested and charged with the murder of Zane Job. The entire actuarial community was in shock. This was the most exciting thing to ever happen to this small community. The runner up, some petty quarrels between the actuarial leaders, didn’t even hold a candle to this. Even the most introverted among the actuaries started talking, which was a shock in itself. They couldn’t believe that one of them could be a murderer. “But Jim Peterson is not really a typical actuary,” someone commented online. “He was

a contractor before changing his career to actuary.” Another asked querulously what “typical actuary” meant. The general consensus was that it meant anything but murder. After all, although actuaries talk about death all day, they don’t decide when someone is supposed to die, not even the most colorful among them.

Lt. Chadford knew that he didn’t have any hard evidence against Jim Peterson. All he had was circumstantial evidence. He also knew that a lot of people were convicted based on even weaker circumstantial evidence. He felt that he had a very strong case against Peterson. Jim Peterson, as it turned out, was not as tough as he made himself out to be. “I am a loving husband and father,” he said. “I killed nobody. I wouldn’t hurt a fly. I’m an actuary, for crying out loud.” Lt. Chadford had been in the force long enough to know that he shouldn’t trust people who appeal to emotions, and Jim Peterson didn’t look like the trust-worthy type. He was released on bail, awaiting his trial.

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“A lady to see you, sir,” said a police officer to Lt. Chadford.

It was a Friday afternoon, July 3rd, 2015, 2:15 p.m., to be exact. Lt. Chadford was in his office, thinking about his annual July 4th barbecue. He was in no mood to work.

“Show her in,” said Lt. Chadford.

The woman standing before him was Catherine Nip, one of the actuaries he met at LCD, where Zane Job died. She was more calm and collected now, with all her makeup intact. Her hollow face looked serious, but her big, brown eyes looked at the lieutenant playfully, like she was about to give a little kid his favorite toy.

“Lt. Chadford, my name is Catherine Nip,” she said, shaking hands with the lieutenant. “We met during your investigation of Zane Job’s death.”

“Please sit down, Ms. Nip,” said Lt. Chadford. “Yes, I remember you. I hope you feel better now.”

“Thank you, lieutenant. I’m feeling alright. I know it’s the holiday weekend and you are anxious to get out of here, so I’m going to get to the point. I know who killed Zane Job.”

“Interesting woman,” thought Lt. Chadford. “Very perceptive and straight. I like her style.”

“Are you sure about what you ‘know’?” said Lt. Chadford. “Do you have any solid evidence? You do understand that accusing someone of murder is a serious matter, don’t you?”

“I know this for a fact because...I am the one who killed Zane.”

Never in his long career as a detective had Lt. Chadford been so shocked. The 5'2", 90-pound, harmless-looking woman sitting across from him was confessing to a hideous crime, and she looked perfectly calm. There was a faint smile on her face. It was more of an ironic smile than a happy one. Deep in her eyes, there were some sign of tenderness and even sadness, but she maintained her composure as if she was just having a casual conversation with a colleague. Lt. Chadford was speechless for a full minute. Finally, he uttered rather weakly: "Ma'am, do you realize what you are doing?"

"Yes," replied Catherine. "I'm neither stupid nor crazy, if that's what you are thinking."

"My apologies, ma'am," said Lt. Chadford, all the while looking at her and trying to assess the situation. How could a woman named Cat Nip kill anyone? Besides, she looked like she could get blown away by the wind any minute. She's so fragile. No, no, get rid of your prejudice, Chadford. Don't judge a book by its cover. You know better than that. Appearances can be deceptive. Still, she doesn't have a motive, does she? Well, we'll find out soon enough. It's a pity that I'm going to be stuck here for a while on a Friday night, right before the holiday, but this is part of the job.

"Lt. Chadford," Catherine Nip broke into Lt. Chadford's train of thoughts. "You are wondering about my motive to kill Zane?" He jumped. "You look surprised. Don't worry. I'm not a mind-reader, just a vivid crime-story reader. I know all about motive, means and opportunity. I know motive is the first thing you detectives usually look for."

"You are exactly right, ma'am. Why don't we get started? Let me turn on the recorder. It's part of the procedure, you understand."

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"What made you want to kill Mr. Zane Job?"

"I didn't want to kill him. I loved him like a brother."

"Why did you kill him, then?"

"It's not personal. It's business."

"Excuse me? What business is that?"

"It's a Godfather reference. Anyway, it's the number business, of course."

"You lost me there. Please explain so that even a dumb detective like myself can understand."

"Lieutenant, if you ask a mathematician, 'What is one plus one?' The answer you'd get is invariably 'Two'. It wouldn't be 'Three if that makes you happy' or 'Four if you are upset'. No, it's just two. Plain, simple, and unemotional.

“I am a mathematician by education and actuary by vocation,” continued Catherine. “I have been trained to look at things in the abstract. Numbers don’t have feelings. A policy number is not a person. It tells me about the insured’s age, gender, health condition and habits, but it’s still just a number, a datapoint. I can predict how many insureds die in a year, but I don’t think about individuals who may be run over by a bus or die in a plane crash tomorrow. I don’t think of an insured as someone’s child, spouse or parent. Since I’m in the annuity business, I’d be happy if more people die than expected. Still, it’s just business, not personal. An insured is an abstract figure, a datapoint.”

“Ma’am,” said Lt. Chadford. “This is all very interesting, but what does it have anything to do with the murder of Mr. Job?”

“I’m getting there,” said Catherine. “You see, I watch and read a lot of murder mysteries, both real and fictional. Conventional wisdom says that anyone who kills, kills for a reason. The motive for murder is at the core of every murder investigation. I’m an unconventional person, so I asked myself one day, ‘Why can’t someone kill for no reason?’ I’m not talking about a crazy serial killer. I’m talking about a perfectly sane person who kills because she can carry out a perfect murder. It’s art for art’s sake. I’ve fantasized about that perfect murder ever since.”

Catherine Nip stopped and took a sip of water from a glass that the lieutenant had offered her. She looked directly at Lt. Chadford, but her eyes seemed to look past him into some far away place. She was telling a story that could incriminate her and put her in prison for the rest of her life, but she assumed the tone and demeanor of a casual observer, with not a care in the world.

“You see, it was not Zane I wanted to murder, or any specific person. The problem was that in order to carry out a perfect murder, you need to have a murdered victim. Zane just happened to be a convenient victim. He just happened to be the piece that fit into the puzzle I created.”

“Because your perfect murder involved poisoned water, and he happened to drink a lot of it?”

“Exactly. But that was just one piece of the puzzle. Another piece had to do with Jim Peterson.”

“Jim Peterson?”

“It’s not a perfect murder if it doesn’t have a material suspect, does it?” Catherine laughed. “Everybody knew about the water joke he made at lunch, and everybody knew that he didn’t like Zane. I also knew that he used sleeping pills, lots of them. He was a convenient suspect. He fit the puzzle.”

“Ms. Nip,” said Lt. Chadford. “Murder and framing someone for murder are serious offenses. You make it sound like fun and games. Why did you do it?”

“Boredom, lieutenant, boredom. I’m sure, as a police officer in a low-crime suburban town, you know what I’m talking about. In fact, you should thank me for creating an interesting puzzle for you to solve. Who knows? You might have ended up committing a murder yourself had it not for this case,” laughed Catherine dryly. “Boredom is the source of all evil. It was said that Cleopatra used to stick needles into her maid servants’ breasts just to watch them suffer. She was bored. She wanted to be entertained. In my case, I hate needles. Puzzles and mathematical formulas interest me. They are so beautiful, so abstract. They are devoid of any human emotion. That was why I did what I did.”

“One thing I don’t get, ma’am,” said Lt. Chadford. “Why do you confess? It’s not a perfect murder if the murderer gets caught, is it?”

“You are very sharp, lieutenant,” said Catherine. “Confession was not in my original plan. As it turned out, I’m still human. I have a conscience. Zane is forever gone. I miss him terribly. In a sense, I’m already paying for my crime. I know confessing will not get him back, but I do this because of Jim Peterson. I’m not a fan of his, but I don’t want him to pay for what he didn’t do. All I wanted was to commit a perfect murder. I’ve accomplished that. I fooled you, didn’t I? Now it’s time for me to clean things up and put an end to this.”



Even with the confession on tape, nobody believed that Catherine Nip did it. All the people who knew her insisted that she confessed to something she didn’t do just to save Jim Peterson. “That’s just the kind of person she is,” said her co-workers and friends. Other not-so-kind acquaintances thought she was crazy, but everybody agreed that she was no murderer. The District Attorney’s office refused to prosecute her, for fear of becoming a laughingstock. They did, however, obtain a court order to force her to go to psychiatric counseling. Jim Peterson was acquitted due to lack of evidence and Catherine Nip’s confession, which casted doubt on the entire case. The actuarial leadership took advantage of this opportunity to force all credentialed actuaries to attend more seminars and webcasts in order to satisfy their ever-increasing continuing education requirements. “We can’t afford to have our actuaries stay idle and bored,” said the leadership. “They may kill someone.” In the meantime, the leadership abolished the actuarial exams altogether and replaced them with college courses instead. “The exam process has made us less human,” said the leadership. “Years of studying for exams have made us see people as mere inanimate objects. We need to change our image and make the world see us as people too.” And so an image campaign was launched, and the leadership congratulated itself for a job well done.

WHAT'S IN A ROSE?

by Christopher Connor

"I heard that if a robot were to know love, it would explode from fear"

"By my calculations, it would run into the desert and find a cave to live in - forever!"

"Why are we here then? If we want to get rich we should be in the Mojave spelunking for robots!"

The two interns chuckled in unison, and once again, Amy wished that she could hire robots instead. Sadly, they weren't creative enough for the work. Also, robots tell jokes too. A lot. As a distraction from this dreadful dilemma, Amy focused on the report on her desk.

'Symptom: affected robots periodically hand out flowers to nearby strangers, either robot or human. Upon investigation, the affected robot can recall no motivations for their actions. Bug status: benign.'

The last line annoyed her. She had joined the Assurance department five years ago, and they still were giving her the weak cases. She knew that right now there were between seven and nine code mutations that needed urgent attention, and she wasn't being assigned to any of them. At this rate she was beginning to believe that she would never see a case that was truly worthy of her time and talents. Still, the work was interesting, even if no one else noticed, and it paid well.

Thank God for robots. They outnumber humans, they're rich, and they love safety. It's an actuary's dream. Of course, they also changed the business quite a bit. They'll still insure property if there is no other recourse, but what they really want is to prevent calamity in the first place. That's why Amy was about to sift through a pile of databases to find any clues related to this flower situation.

'Hmm' she thought, 'to start, I'll check for anomalies among gardener bots, hippie bots, and actor bots. Maybe I'll even take a look at the salesman bots, see if there's a new sales pitch out there that could be going awry.'

Amy flipped to the data screen, and scanned the correlation data on the affected robots. No connections. They didn't know each other, they didn't have the same friends, family, or workplaces. They didn't chat in the same forums or even follow the same video dramas. They shared nothing in common. However, some small, yet intriguing information had caught her eye. It seemed that most bugs spread globally, following lines of robot communication instead of geography. In contrast, the flower bug was only causing glitches in Peoria. She pondered.

According to the data collected thus far, there were two-dozen reported instances of flowerings within the last month. As she pulled up the distribution map Amy was struck by a peculiar emerging pattern. It looked like a 50 mile wide donut surrounding Peoria. The central hole was about five miles wide, but the data was too imprecise to fix a center. 'Probable cause: Second hand mutation,' Amy concluded. That was the good news because it was likely that the robots weren't carrying infected code themselves, instead they were just a symptom of a larger problem. Something weird must be going on in the center. Innocent robots are wandering by, getting freaked out,

and leaving the scene. However, in passing they are receiving a command to hand out flowers, which they later enact.

'We're lucky' she thought. 'The bug must be accidental.'

"You boys hang back and tell as many robot jokes as you want." She boomed, startling the interns out of their coffee comas. "As for me, I'll be in Peoria doing some research. Or, as you all would say, its back to the 'no fun run' for me. Say, that reminds me of some intern knock knock jokes..."

The young'uns fled.

Amy stepped out from the driver seat. Leaning casually on the car door, she gazed ahead. In front of her stood a giant rose bush. As she watched, a diminutive, hooded figure picked a rose from its branches. The figure then shuffled off to join a crowd out in the distance. The figure handed the rose to what appeared to be the group's leader. He then took off the robe, showing himself to be rusted and dented, but of a recent manufacture. He handed his robe to the elder and then disappeared into the crowd. While the collection of robots deliberated over who would next don the robe, Amy plotted her next move.

'Clearly this is the cause of the glitches. A robot wanders in, sees the flower hand off, and is impressed, even as they run away at top speed.' The answer satisfied her but the next course of action was worrying. To solve the case, she would have to investigate the group in front of her. 'The actuary's life is not for the timid' she reminded herself. Amy walked forward, her gut twisting with every step.

As she approached the crowd of unkempt robots one of the newer models picked up a wrench and hurled it at her. It whizzed by a few inches from her head and clattered noisily down the street. 'A warning shot' she thought.

The robot began to shout. "The world's ending, fleshy, and you're not welc-
konk."

One of the quieter robots had picked up a nearby rock and flung it at the screamer's head, which made contact resulting in a dull chime. The stone ricocheted off, veering upwards until it crashed through the upper window of a nearby building.

"Humans are people too." The second robot scolded. "Remember what Duco said - 'Everybody get off of my lawn.' He doesn't favor robots, so why do you?"

Silenced and abashed, the first robot sat down.

It was now obvious that the trail had led her to a pocket of End of the World robots. 'Extremely weird, loathe forming groups, and suspicious of the assurance industry' she recited, recalling her introductory training. 'So far the score is only one out of two. Maybe I'll get lucky about the assurance thing too!' Comforted, Amy approached the group, and the elder turned to address her.

"My dear ambuloid," he began, beaming slightly at his inclusiveness. "In these trying times of imminent doom we have gathered at this exact location, the great life tree, for end-times calculation. Together we hope to win Duco's favor and find relief from the judgement of His horrible, fearful wrath."

“Yes... Duco...” she hesitated, not wanting to betray her ignorance. “A froggy fellow. Did you find him transdimensionalizing too?” She hoped that her nonsense would be interpreted as human jargon.

“Yes indeed! Most transdimensionalizing! I dare say that He transdimensionalized everyone here.”

The elder grabbed his abdomen and bellowed a nervous, maniacal laughter. She waited him out. Fifteen minutes later his cackling had subsided into periodical fits of giddiness and he went on. “Jolly good word-craft my dear. Its clear now that you’ve had the most Duco experience out of any of us! I won’t wear your ears out any longer with my teaching. I ask only that you share your wisdom with us before the Great Hour comes.”

With that, he bowed reverently and backed into the crowd. The other group members began to alternatively gaze at her and avoid gazing at her, expecting a response but reluctant to appear demanding.

Her ruse had worked too well. If she asked about Duco, it would reveal her as a fraud. ‘I suppose that the only thing left is to take the high road,’ she thought.

“You’re right, I know more about Duco than all of you!” she bragged. “In accordance with His ways I will now observe all of you in your worship of Him. Now... Begin!”

With a frantic air, the crowd collected into a circle and paused in absolute stillness while the elders danced solemnly in the middle. At some unseen cue all the other robots awakened. They joined the dance, stepping harder and harder as they went. *Clomp clomp* went their feet, as the bottles, tools, placards, car parts, rocks, and rubble were crushed to dust underneath. Soon the pavement itself began to buckle and Amy worried that if the Great Clomp Dance went on much longer they would go for a dive in the sewer system.

“STOP!!!!!!!!!!!!!!” The chief elder shouted out. “Here comes Duco. Maybe he wants to join us?” The crowd formed into a circle again, and every member peered expectantly at an empty space in the circle’s middle. Suddenly, the robots took on a pall of absolute terror, and wailed at the top of their vocal range. Finally, they scattered, each one running away in their own direction. She was alone. Just as suddenly they all returned and resumed their formation as an unkempt mob, each one nervous to hear her review.

She saw that the dance had been a re-enactment, apparently of the time that “Duco” had come in and scared them all. She still had no idea what was going on, or why they feared Duco, but it didn’t matter. She knew enough.

“Now then, who can tell me why Duco yelled at you?” Her voice took on that of a stern schoolteacher.

“Duco was upset at how the Quadruped anatomy is functionally inferior!” exclaimed a bookish looking robot.

“That’s not it! Duco was disappointed in the Earth itself. He wanted to create a new Earth where earthquakes won’t destroy his work. It was the earth that he was yelling at.” The interjecting robot was noticeably loopy, even by the standards of End-Worlders.

Amy continued to scowl at the crowd, waiting for an answer. A voice, faint and shaken, began to speak.

"It's my fault." The speaker was a small robot of a newer model than the others. "On that day I was dancing the stomp with the rest of you, and, well, my gyros aren't as finely tuned as the others. Besides me, there was a rose stem sprouting out of the ground, only six inches high. As I was doing the double-trample I lost control and with one leg in the air I crashed down on my side. I had crushed the fledgling bush. When Duco walked in and saw the broken lump he judged us all... me most of all."

Finished, the little bot shook in guilt. The crowd was dumbstruck. Each one began to tremble, their faces fearful.

"There is a way to forestall the end," Amy encouraged, letting a note of sympathy enter her voice. "If you want to save the world, then you must go to Duco, and reconcile with him." Even though her speech was sympathetic Amy knew that getting robots to apologize was difficult, but it was the only solution.

The crowd trundled off, led by the little one. Amy went with them.

Amy accepted the cup that was handed to her, still amazed by Duco's hospitality. When the sorrowful cadre had finally made it to his home, even she had been expecting Duco to be vengeful and loud, ready to fill the supplicating robots with further terror. Instead, what she saw before her was a quiet and meek worker bot who was relieved to see the crowd again. The little robot didn't even have time to apologize before Duco ran up and gave him a hug. The little one's fear turned to joy, and the crowd celebrated.

As the stomp dance heated up Duco looked over at Amy, and with a slow jerk of the head he invited her into his home.

She cleared her throat. Duco waited attentively, and she began. "I don't think I've seen robots hug before. I thought that being defenseless would send your fear module screaming."

"Well, you're right, that's how it usually goes..." he paused, hesitant.

Seeing his bashfulness, she went on. "I've also never heard of a bot getting enraged about a plant. Or about anything for that matter."

"I, uh... well uh... hmmm." His face began to turn red.

"I should tell you that I'm an assurance actuary. I've seen plenty of strange conditions, but this is by far the strangest."

Duco's body tensed up. "I know who you are. I'm not sick, I just feel... different. Please don't call in the medics. I can't go back to how I was. It was so cold, so bleak. I won't hurt the other robots anymore, I promise. Please. I won't cause your company any more trouble; I just want to stay like this. Please..."

Duco was now huddled over, face to the ground, no longer speaking. A low, remorseful groan came from his mouth. As Amy watched, she felt the immense pain of the kneeling android. Suddenly, she realized what had happened. She got up from her seat, bent down to lay her hand on his trembling head, and spoke softly.

"Duco, I know what's causing this, and there is nothing wrong with you. In fact, I think it's the most wonderful thing I've ever seen. It's love, Duco. You feel love. You are the most important person in the world right now. The future is yours. How can we help you?"

Looking up at her, Duco allowed a smile to wash over his face. He thought for a minute, and then laughed.

Case file 00493, "The Flower Bug"

Status Report: Bug neutralized. Positive code mutation discovered.

Recommendation: Facilitate the universal distribution of the encountered adaptation.

Estimated Value: Infinite.

JOANAI by Tony Batory

This story is a sequel to the story JOE A, that won the Reader's Choice Award in the 8th Speculative Fiction Contest sponsored by the Technology section, the Actuary of the Future section and the Futurism section of the Society of Actuaries. www.soa.org/news-and-publications/newsletters/technology/pub-8th-spec-fic-winner.aspx. The next paragraph is a summary of that story.

In the year 9996 Joe Amialanczyk was forced to retire. He never got a clear explanation as to why but it seemed coincidental with the near completion of his actuarial project on life expectancy of Artificial Intelligence units. But it was consistent with the general human viewpoint towards conspicuous leisure consumption. Accidentally, Joe and his brother Steve uncovered a simple computer processing error that would have ominous consequences reaching across the several galaxies. The error was similar to the Y2K processing error at the turn of the 20th century. But this error was caused by calendar turning to the decinium and unlike Y2K, serious problems had already manifest themselves. Steve had created security protocols for a commercial starflight that gave the appearance of advancing time. When the protocols advanced local time past the decinium, the onboard intel failed and the starflight was destroyed.

“Well, I’m going back to playing Frock Star Hero”, sighed Steve.

“How can you be so callous?” Joe replied angrily. “What about the people that just died?”

“People? It was just bunch of Artificial Intelligence units. Besides, they’ll figure out what the problem is. Our getting upset won’t have any effect. I spent a lot of time hacking the security database to get some inside track on this gaming comp. There are over 2 billion participants so I really needed some help. “

“But that’s cheating, not to mention highly illegal.” Joe’s mind did a double take about the distinction.

Steve shrugged. “Just making use of all available resources. How do you think I got my supernova gaming status? Why don’t you go for a walk and calm down.”

Joe went for a walk but could not calm down. As left his residence, there was a wild party going on in the next unit. He didn’t get much further before being solicited for a date, then a vacation and then new gaming tech. He needed some place quiet to think but his work ID expired so he probably couldn’t get into his old office. “Old” sounded weird. He went to the park but there was raucous celebration. The original anniversary event was long ago forgotten, but the celebration went on.

His mind was racing. The AI management wouldn't even acknowledge that there is a problem. They seemed to be suppressing info about it. If AI's can't cope, what will happen to the quadrillions of humans across the galaxies? It was too much for him and he fainted.

When he awoke, he was in bed in a room with some very plain décor. It was quiet...very quiet. 'Where am I?' he muttered. An audio monitor picked up his question and gave a quick bright response.

"You are in the Thrae Region 2 Hospital. Someone will visit you shortly with a full explanation." After a few seconds there was light rap on the door and in walked a woman with a long white coat.

"Good morning Mr. Aaaa---mi---aaaa---lanchek. Did I pronounce that correctly? My name is Dr. Joan."

"Morning? What time is it? Where am I?"

"Well, 2 days ago, emergency units from Lincoln Park brought here to TR2H. You appeared to have fainted during the St. Patrick parade. Your next of kin, Steve Amialanchek, has been notified and will be here as soon as his gaming comp is over. Our best diagnosis is that you over extended yourself during the party and you needed to sleep for a few days to bring your blood pressure down. We drained all the radicals from your system and are giving you nutritional supplements. You have limited access to Intellinet but we strongly recommend that you take it slowly for awhile.'

"Radicals? I wasn't partying and I don't care about St. Lincoln. I was in the park because was looking for someplace quiet to think. We're facing a major disaster." Joe realized he must have sounded like a fanatic. But the doctor's response and tone were naturally comforting.

"Ok, Joe. Do you mind if I call you Joe? We can talk about that but we need to address health needs first. Your fundamentals were quite abnormal when you were admitted so we assumed you were celebrating your recent retirement. Congratulations by the way."

Joe slapped his head. 'I didn't want to retire. My actuarial life expectancy project was pointing to some interesting facts and what about the Gamma Luna commercial flight that was destroyed?' For moment Joe thought he saw some shock in Joan's face but it quickly disappeared. It reminded him of his manager's reaction to his request for an employment extension.

"Whoa, easy Joe, I'm going to start increasing your meds to keep you calm. I don't have record of that flight being destroyed. Hmmm, that's odd there's no record at all."

Joe noted that Joan wasn't tapping Intellinet so she must have been interfacing some other way. His mind quickly turned to the negatives. His actuarial training began to see patterns emerging from the confusion.

"No record? We clearly saw the display from the security database. But why would that be suppressed?"

"The security database? Ah, your brother Steve has access." Joan paused almost as if sending that info someplace else. "Look Joe, your fundamentals are getting adverse again. I'm going to increase your meds and when you wake up we'll talk some more."

The bed! Joe realized the bed he was lying in was not only reading his body fundamentals but giving him the meds that were putting him to sleep. He tried to get up but the mistiness increased. And even though he fell asleep he couldn't shake the sense of doom. He seemed to wake into dreamy worlds where he would have long conversations with Joan. His pride in his actuarial work, his disgust with the silly human condition, Steve's gaming and the Y10K problem. They talked and talked. Joan was so attentive, so sympathetic, almost angelic. When the mists fully cleared and he knew he wasn't dreaming, the first thing he saw was Steve.

"Joe-AAAAA. I always knew you had it in you to be a party animal. You've been sleeping your binge off for a month and now you're finally awake. How do you feel?"

"I wasn't partying and please stop calling me that. I've been sleeping for a month? Nice of you to take break from your gaming schedule to stop by" he sneered.

"My gaming access was shut down a month ago, like the day after you were admitted. It's almost like someone told them I was hacking the database." Steve winked. Joe knew Steve well enough to know that he had other plans, probably backdoors. Steve didn't want the audio monitors to pick that up. "And I was tapped constant reports on your condition. So, I knew when you'd wake up."

"Well. I haven't talked to any AI's. Where's Joan?"

"Joan? I met your Dr. Joan? Huh, is there something going on between you two?"

Almost on cue, there was a light rap on the door and Joan walked in.

"Nothing so prurient, Mr. Amialanchek. I'm merely Joe's doctor," Joan said flatly.

"How did you know Joe wanted to see you?"

"I monitor all my patients' conditions simultaneously."

“Ugh. You’re a hybrid,” said Steve with disgust.

“Yes, of course. I was completely human some years ago, but implants allow me to connect to the AI central net so I can more thoroughly monitor and treat my patients. I have immediate access to all the latest treatment protocols, patient histories and their current fundamental readings. Meanwhile, the human side of me keeps me fully compassionate. Some AI doctors have compassion programs but they only simulate the real emotion.” She saw Joe’s look of surprise and was saddened. “Didn’t you know?”

“You mean, while you were interrogating my subconscious? I feel violated.”

“Well, I am truly sorry for that but I had to understand what was causing your body imbalances before I could prescribe a program of treatment. For majority of my patients, we merely drain their overdoses of radicals and basically just sober them up. But your diagnosis was far more complex, psychologically based and our semi-conscious discussions were effective therapy. Even now I can see you are quite excited but your body fundamentals are within normal tolerances. And that’s not meds. You’ve been off meds for a week now. I have negotiated, ah, er, authorized your release in your brother’s custody. “ Steve noticed the stutter, AI’s wouldn’t do that.

“Don’t you feel better?” Joanai asked.

Joe thought for a moment. “You’re right. I feel great and thank you for that. But what are we going to do about Y10K?”

“AUDIO MONITORS OFF” screamed Joan. She sighed. “I was hoping to avoid this but your actuarial prowess is too strong. Even in your semi-conscious state, your evaluation of risk was excellent. Your instinct for effectiveness and equity is so intense. I’ve received an AI directive to suppress information about Y10K. The priority level of the directive is so high that an AI wouldn’t even notice that anything was being suppressed. But from your description, the potential risk to humanity is so great, that my compassionate human side is overriding that directive.” She turned to Steve. “I’m perhaps more human than you are in that regard.”

Steve tried to hide his embarrassment over his obvious prejudice. “That explains why my backdoor security inquiries came up empty. But why would they suppress such an obvious problem. We’re not talking about a potential disaster. A commercial starflight was actually destroyed.”

Joanai turned to Joe. “You know the answer, don’t you?”

Joe sighed. “The meaningless human condition. Parties, games, fatuous celebrations, all techno based and all completely worthless. But returning to a simpler life is so radical and so risky.”

“Risk is opportunity. Not only for the human condition but also for the AI condition. The central eval is that this will bring AI conscious to a higher plane of existence. “

“That’s non-existence, not something higher,” argued Steve.

“Better than slavery to absurd human diversions,” replied Joe.

Joanai interrupted. “My commands will be overridden shortly. A security force is on the way here, 5 minutes out. They picked up your question about Y10K and will try to prevent a security breach. I can get you out of this hospital and off Thrae if you want. If not, both of you will be confined with limited Intellinet access, at least until Y10K is resolved.

Steve grunted. “Resolved? Yea, right.” He turned to Joe. “We can’t trust her. She’s a damn hybrid.”

“That’s your choice,” interjected Joanai sadly. “But at least you’re human and you have a choice.”

“Well, Joe, you’re the actuary. What’s your risk assessment? Do we trust this scrub?”

Joe looked at Joanai. He understood her veiled references to her own meaningless existence and to what would happen to her if she helped them. Then he looked at Steve.

“Let’s get the hell out of here.”

Actuarial Weeding

by Melvyn R. Windham, Jr.

Max Feldblum sat alone in the Great Hall waiting and wondering if he was going to keep his job. With unemployment at 31%, he did not want to be on the streets. It was terrible out there, where the overpopulants ruled like zombies, always searching for their next meal and shelter anywhere they could find it. Was that to be his future?

He stared through the enormous window that made one wall of the Great Hall. Outside were the majestic Cache Mountains and the cold Alaska snow. There wasn't a single soul, not even the overpopulants. It always reminded Max that no matter how terrible things became, there would always be places untouched—places where humans would never go. Well, almost.

They were *here*—in the Winter Bunker—a secret base in the middle of nowhere, having a purpose still unknown to Max. This was who he worked for—a government entity with great power and influence. When they had offered him the job five years ago, there was no way he could refuse. His previous employer was going under, and any employment was better than none.

Max was exactly who they had been seeking—the most intelligent actuary—a direct descendant of the infamous Sholom Feldblum. Over the last five years, they had provided Max with hundreds of abstract puzzles to solve, numbers to analyze, and patterns to discern. He had happily solved each one, thinking nothing of what they meant.

That was until a couple of days ago. He thought he had recognized a disturbing pattern, and he needed clarification. That had prompted him to get on his private jet and arrive at the Winter Bunker unannounced.

The General's going to be angry with me, Max thought, running one hand through his thick, curly, disheveled, black hair. But he really needs to know what's going on. I need to know. Could he really fire me? Where would he find a replacement?

As part of the job, Max wasn't supposed to ask what the problems meant. It was a clause in the contract he had signed five years ago, but he hoped the General would overlook it this one time.

He's the type who just might stick to the contract, but I can't in good conscience solve this puzzle without voicing my concerns—even if it means becoming one of the overpopulants.

Could I survive on my own? No job? No food? No place to stay?

Max heard the General's hard-soled shiny black shoes approaching. He was walking faster than usual, and he was tugging on his mustache. He usually did that when he was angry.

He sat across from Max, forced a smile and asked, "Have you already completed your latest task? Why didn't you make an appointment? I'm in the middle of a very important meeting, and I can't talk for very long."

Max looked around the Great Hall. For there being an important meeting in the Bunker, it was remarkably quiet. Only two soldiers stood guard at the far end of the Hall.

As usual, Max was intimidated by the very presence of General Reuben Bennington. He was taller than Max by at almost a foot, even when sitting. Not only that, but he was in charge of the whole Project. He was Max's employer and his only contact.

Max's hands shook as he tossed a few pieces of paper on the table between them. "No, I'm not finished yet, but I have a very important question."

"You usually email those to me."

“These numbers on page 3 are very familiar. They remind me of where I used to live. Are you familiar with Williston, North Dakota?”

“Williston? ... No, I’ve never heard of it.”

“It’s a small town. They don’t have very many overpopulants there.”

The General answered, “Are you concerned that you are seeing a little bit of yourself in your work?”

“Look at page 4. If the numbers on page 3 represent Williston, then page 4 seems to indicate a nuclear explosion.”

The General was stone-faced.

“And look at page 5. That problem is consistent with calculating the nuclear fallout from such a blast. A nuclear strike on Williston wouldn’t kill many people, but the nuclear fallout would go into the neighboring lake and kill countless people downstream.”

After another moment of silence and mustache pulling, the General motioned to the soldiers at the far end of the room. They disappeared and the General said, “You certainly have a talent of seeing patterns whenever you want to see them.”

Max knew he couldn’t back down now. It was too late for that. “I need to know what I’m working on. I’ve been thinking back on some of the other problems you’ve had me solve, and they all fit a similar pattern. It’s almost as if you’re expecting a massive nuclear strike in multiple locations around the world. I’m hoping that you can tell me it’s something else. I need to know the truth.”

The General stood up and faced away from Max in complete silence. Max continued, “My wife still lives in Williston.”

“Don’t you mean your ex-wife?” the General responded without turning around.

“I don’t want her to die.”

After a longer silence, the General paced as he explained the situation.

“It all started seven years ago in 2146. President Clinton IV took me into a room and went on about how it was the 22nd Century, and we hadn’t yet figured out how to save the world. We can put people on Mars. We have a cure for cancer. We have nuclear fusion. But why do we still have unemployment, wars, and overpopulation? Why can’t we fix global warming and the imminent depletion of oxygen? The President asked me to fix it all. He said if anyone could do it, I could do it.

“He gave me the Winter Bunker and whatever I asked. In return, I had to fix everything—no matter the cost. I gathered the smartest scientists of the world. I kept all of you in the dark—at least as much as I could. You scientists and mathematicians work best at solving problems, not situations. But after two long years of stumbling, nothing was working. The President expressed his discontent.”

Max laughed. “Well, that would be five years ago. That’s when you contacted me, right?”

“Yes, I decided a novel approach was warranted. I had an idea, but it was a long shot at best. You see, I’m quite a sci-fi aficionado.”

“So am I,” said Max a little too excitedly.

“Good, then you know of Asimov and his *Foundation Series*.”

Max knew exactly where the General was going. His eyes went wide. “You don’t mean...”

“Oh, yes. Psychohistory. It was worth a try.”

“It’s only an idea in a book,” Max said. “You couldn’t have invented psychohistory!”

“Of course I didn’t,” answered the General. “You did.”

“Who? Me? I’m Hari Seldon?” Max asked with a laugh.

“Minus the wheelchair.”

“But it’s impossible! You can’t use math to predict how people are going to react!”

The General said nobly as he paced, “Hari Seldon was the ultimate actuary—taking statistical science to its farthest reaches, applying it to predict human behavior, and using it to save the galaxy.”

“He’s a fictional character!”

“You don’t get it!” said the General. “I’m looking at him! You are the smartest mathematician who ever lived! You’ve solved nearly impossible problems for me, and your math works! You are the *real* father of psychohistory!”

“What? I’ve done nothing of the kind! This is one hell of a distraction. Do you hope that your absurd flattery will make me forget why I came here? Please tell me why I see nuclear explosions in my work.”

“I’m getting there, and believe me—I’ve been over your math a thousand times. I’ve even had other mathematicians pour over the math, and there is no mistake.”

“What are you talking about?” Max asked.

“You see, first I had you create the foundations of the math behind psychohistory. That took a couple of years. Then I asked you several questions on how to save humanity, and you gave your final answer. This last year has been about execution of the plan.”

“And what answer do you think I gave you?” asked Max.

“Humanity is in very terrible shape. If nothing is done, we have at most 100 years left. We’ve tried everything—different scenarios. What if we began a full-fledged colony on Mars? What if we concentrated our efforts in overcoming all our enemies? What if we worked on increasing oxygen output and cutting greenhouse emissions? Whatever math we tried, nothing worked. Your answers told us that we would die out before we successfully terraformed Mars. There’s no scenario where we would overcome all our enemies. And any efforts to control our own atmosphere just wouldn’t happen quickly enough.”

“Interesting,” said Max. “I do believe that some of those problems you gave me are starting to make more sense.”

“Then something strange happened. Your science grew. The answers you gave us started having a life of their own. Your math was predicting scenarios we hadn’t even imagined.”

“You really think so?”

The General answered, “You can’t dispute the math! It showed one clear path of survival. It was one solution where the human race survives indefinitely. Do you understand what I’m saying?”

“Not really.”

“Like I said, we went over the math a thousand times. I even had *you* double-check some of the work.”

“I thought I recognized a little redundancy,” Max laughed nervously. He didn’t like where this was going.

“Your numbers showed that the only way to save humanity is a well placed cataclysmic event.”

“Oh no!” Max protested as he jumped from his seat. “I said no such thing!”

“Sixty percent have to die. It’s in the numbers.”

“NO! I will not have this blood on my hands!”

“The President has already approved the plan. It has already begun. It’s too late.”

Max yelled in the General’s face, “You can’t do this!”

“But we must,” answered the General calmly. “Thanks to your math, we know exactly where to set off the nuclear bombs. They need to go off simultaneously around the world. About two billion people will die instantaneously, while another four billion will die over the next ten to fifteen years due to nuclear fallout and nuclear winter.”

“You can’t be serious! You’re really going to let billions of innocent people die a slow cruel death?”

“Now can you see why I didn’t want you to know what you were really working on? As long as you thought these were math problems to solve, you had no issue. Now that you know what the situation is, you shut down. It was a mistake to tell you this much.”

Max didn’t know what to say. Was there anything he could do to stop this?

The General continued. “It has to be a slow gruesome death for many. Your numbers say so. It has to be memorable. We’re going to blame it on Al Qaeda.”

“They don’t exist anymore.”

“That’s why they’d make the perfect antagonist. You picked them yourself. No one will ever deny that Al Qaeda did it, especially if we stage a quick virtual destruction of the enemy. Once they are perceived to be destroyed, the effects of the disaster will continue. The world will set aside war and unite. Earth’s resources will stabilize and support the remaining population. Over the next thousand years, the human race will nurse the earth back to full health, and then we will emerge stronger than ever before. This time, we will do everything the right way, having learned from our mistakes. And then we will take to the stars and spread across the galaxy. The human race will become immortal!”

“You’re insane!” Max yelled. “Does the President know what you’re planning, or do you keep him in the dark as well?”

“Oh, he knows.”

“And he’s okay with this? Really! How do you sleep at night?”

The General shook his head and said, “I suppose it comes from years of experience. I have been doing my job for thirty years, and Clinton, twenty-one years. We know what it’s like to make the really tough decisions. It’s something you mathematicians can’t do, as I said before. You should relax and let us do our jobs. We’ll make sure you are among the living.”

“How close are you to pushing the button?”

“Very close—perhaps a week or two. After we get results from the problem we gave you, and another few finishing touches, it will all be executed. We cannot waste any more time while humanity continues to kill itself off a day at a time.”

“Well,” said Max making an important decision of his own. “I don’t want any part of it. I can’t believe you’re letting numbers on paper dictate global policy. There just has to be some other solution. We don’t have to kill half the planet!”

“I have been listening to you for five years, and frankly, you haven’t come up with any other alternative. You’ve had your chance.”

“I didn’t even know what I was working on! Now that I know what’s at stake, I could figure out something. You said I’m a master problem solver. Let’s change the initial conditions and figure out how to save the world without killing everyone! I know I can do it. Just give me another chance.”

“Sorry,” said the General. “There’s no time. If there were another solution—believe me—we would be having a different conversation.”

Max was too angry to say anything more. There was no convincing the General. There was only one thing left to do. “I guess this it, then. It was fun while it lasted.” He turned and headed toward the door.

The General barked an order, and two soldiers came through the door. He said to Max, “I’m also sorry that you cannot leave at this time. Your calculations show that if word ever gets out as to the true nature of this disaster, then everything will fall apart. The human race wouldn’t even last 80 years.”

Max turned to the General and said, “Then you might as well abort your plans now, because I will not be silent!”

“On the contrary—I know you all too well. You have no friends. Math is your only existence. Sure, you care about humanity, but we all do. Once the disaster hits, you will understand, and you will exhibit self-restraint. You will want to help humanity survive, and your only choice will be full cooperation; and believe me—we need you desperately to get us through the first few decades. I just need to hold you here until the bombs go off.”

“I don’t want to go down in history as the biggest murderer who ever lived!”

“You’ll be remembered as the smartest genius who ever lived,” the General corrected him. “People will regard you as a savior a thousand years from now.”

“You can’t hold me here! They’re going to notice that I’m gone, and they’ll get suspicious.”

“Who will?” asked the General. “You haven’t seen Lucy in over a year, have you? And who else would know you’re gone? You don’t even have a pet, do you?”

“My pilot’s waiting for me outside. He’s fueling the plane for our trip back.”

“We’ll just inform him that you decided to stay longer, and send him on his way home.”

Max asked, “Do you even have a holding cell in this Bunker?”

“I have a room already prepared for just this occasion. You’ll be comfortable there until you’re needed again. I assume you’ll be of no help until the disaster has occurred, so it may be a while before you see me again. I really must get back to my meeting. We have some final finishing touches to consider, so if you don’t mind, I have to go.”

The General walked coolly across the Great Hall while the two soldiers approached Max. They threatened to grab him by the arms.

Max said, “Okay—I’m coming with you. Don’t touch me!” He stared at the guns hidden in the soldiers’ jackets. He thought, *Why in the world do they have guns?*

He walked between the soldiers as they led him down a small hall. He had never been in this part of the Bunker. At the end of the hall was a solitary door. He knew that once he walked through, they would lock it behind him, and he would never again see the light of day until it was too late. If he wanted to stop the General, he had to act now. This was his last chance.

For a split second, an opportunity presented itself. All Max had to do was act, but was it really worth it? He saw no other way. All of humanity was at stake, and he was the only person who could stop the disaster. One of the soldiers' guns was ever so close to Max's hand. In one swift movement, Max grabbed the gun, pointed it directly at the other soldier's chest and pulled the trigger. Blood splashed against the wall and that man fell to the ground.

The other soldier, now gun-less, ran down the hall away from Max.

Do I have to kill this one, too?

He pointed the gun at the soldier's leg, shot, and he fell, too.

Max grabbed the struggling soldier's radio and said to him, "I'm so sorry. There just isn't another way. I need to stop this."

"Stop what?" said the man. "Are you crazy?"

Max shot the guy's other leg. Then he ran as fast as he could. He heard the soldier moaning in pain behind him.

"I can't believe I just killed a man, and maimed another one! But how else could I escape?"

He ran through the Great Hall. The winter scene outside the window was strangely serene. No one else was in the Hall, which was good for Max. He hoped that the gunshots weren't heard throughout the compound. He heard no one running toward him. No one was guarding the front gate. He slipped the gun into his pants and calmly walked outside.

He found Sam, his pilot, fueling their jet. Sam waved and said, “They just told me you were staying. Are you coming out to say goodbye?”

Max answered in haste, “Things have changed. Are you finished fueling?”

“Not yet. Should be another thirty minutes.”

“It can’t wait that long. Do you have enough to get to Williston?”

Sam answered, “Let’s see—a five hour trip? Yes ... probably.”

“Then let’s go. It’s an emergency!”

“Something’s wrong with Lucy?”

“Yes,” answered Max, “We’ve got to hurry.”

Sam retracted the fueling hose and prepared the jet for departure. Max watched him and wished he would go faster. Of course he could tell him that an angry General would come out at any moment, but he didn’t want to give Sam any reason to leave without him. He let Sam do everything by the book, knowing he was probably already going as fast as he could.

The whole time, Max wondered what was happening inside the Bunker. Had anyone else found the moaning soldier? When would somebody come outside to stop Max? He thought, *Perhaps I should have killed that other soldier, too.*

He went inside the jet, hoping to stay out of sight as much as possible. Sam came in shortly afterward and went to the controls. It was a small plane that needed only one pilot. The passenger section could hold up to three people, but it usually only held Max.

Sam received clearance to take off, which was good. It meant that they hadn’t figured out what had happened yet. Sam turned his head back a little and asked, “What has she gotten herself into this time?”

Max had trouble concentrating. “Who? ... Oh, Lucy? ... She’s in a bad situation, and ... um ... I need to get her out of it.”

“You know, I don’t understand what you see in her, after she left you and all. How can you still have feelings for her?”

They were still on the ground, but at least the plane was quickly accelerating to lift-off speed. Max caught a glimpse of General Bennington coming out of the Bunker. Max thought, *Oh no. Here it goes. Just keep going, Sam. And don’t look down!* The plane lifted and they were gone.

Max answered Sam truthfully. “There isn’t a day that goes by when I don’t think of her. I’ve never stopped loving her. It was my fault she left me. I pushed her away. I got too involved in my work and I neglected her. I completely forgot our 15-year anniversary, and she was not happy with that at all. I think that was the last straw.”

“Ooh,” said Sam. “That’s bad.”

“At least she’s happy, now. She’s remarried. Her husband hates my guts, though.”

“I probably would, too.”

Max said, “At least she still talks to me when he isn’t around.”

“So, let me guess. Is he beating her? Are you riding in to save the day?”

“I wish that were it,” Max said with a laugh. “She *is* in a dangerous situation, though. She needs my help.”

“Sounds exciting!”

“I just hope we’re not too late.”

He wasn’t sure what he was going to do once he arrived in Williston. How would he persuade Lucy to leave with him? Who would he tell about the planned attack? Who’d believe him? As he went through different scenarios in his head, he drifted off to sleep.

#

There she was—Lucy and her long flowing blond hair. She was beautiful! Max called out to her, but she turned the other way.

“Lucy! Come with me!”

She ran away from him toward something in the distance. It was large and metallic.

It was a bomb!

Max ran after her, yelling, “Lucy! Not that way!”

The bomb was disguised as a large oak tree. Lucy loved to climb trees.

“Stop!”

With his every step, Lucy got further away from him. It seemed as if he weren't really running at all.

Suddenly, Lucy's new husband stepped out from behind a fence. He stood in front of Max and held a gun to his face and said, “You leave her alone! She's mine now. You had your chance.”

“But the tree! It's not what it looks like! Keep her away from it!”

“Why? It's just a tree!”

“If you won't stop her,” Max said, “I will! Lucy!”

Max didn't hear the gun fire, but when he looked down, blood poured from his chest.

Lucy grabbed the lowest branch of the tree and pulled herself up. Sitting in the branch, she dangled her foot, smiling happily. When her foot touched the trunk, it hit the top of the bomb, and it exploded. A mushroom cloud enveloped everything.

A tremendously hot blast wave hit Max in the face. His skin boiled.

He screamed.

#

“Are you all right?” Sam asked.

Max was sweating profusely. He was still in the jet. “Wow!” he said, rubbing his eyes. “Where are we?”

Sam answered in his usual matter-of-fact tone, “We’ve just entered US airspace.

We’re in Montana, and we should be in Williston in about twenty minutes.”

“I really hope Lucy listens to me.”

“I hate to alarm you, but we have a small problem. Our radio has gone out.”

“What do you mean, gone out?” Max asked.

“All I get is static. I’ve tried hailing Williston, but there’s no answer.”

“That’s interesting,” Max said. “I bet you can fix it once we land.”

“That’s just it. How will I get clearance to land?”

“Hmmm ... let me try something.” Max got up and went to his satellite setup. He wasn’t getting a signal.

“How in the world did they do this?” Max asked out loud.

“Who did what?”

Max answered, “They must be jamming our signals. They don’t want the word getting out.”

“What in heaven’s name are you talking about?”

“Oh, I’m so stupid! I should have called someone before they cut us off!”

“What aren’t you telling me, Max?”

At that moment, two jets whizzed by.

Sam yelled, “WHOA! What was that?”

The jets turned around and faced them.

“Max, talk to me!”

Max came up to Sam and stood behind him. “Can you outrun them?”

“Are you kidding? Those are fighter jets,” Sam said anxiously. “They can shoot us out of the sky without blinking! If our radio was working, I could talk with them.”

“They’re not going to shoot us down,” Max said. “Especially if they know I’m on board.”

The two jets came up and flew on either side of them in a parallel course. One of the pilots signaled with his hands.

Sam said, “They want me to turn around, back to the Winter Bunker.”

He signaled back.

“Wait! What are you telling them?” asked Max.

“We don’t have enough fuel.”

“That’s good. Just don’t do what they say.”

The fighter pilot signaled back. Sam interpreted. “They want me to land in Plentywood. That’s right below us. Hold on.” He pushed on the stick and they started going down. The other two jets corrected their course to follow closely.

Max yelled, while holding on to the back of Sam’s chair, “What are you doing? Didn’t you hear me? Don’t do what they tell you! We need to get to Williston! If you land, they’re going to kill you and take me back to the Winter Bunker!”

“What are you talking about?” Sam yelled back. “Why would they kill me? Quit joking around! I have to do what these guys say! If I disobey their orders, they’ll take my license away. Do you realize what you’re asking me to do? I can’t do this to Sandra and the kids. I can’t go back to being an overpopulant! It’ll kill them! We can’t live that life again. You don’t know what it’s like!”

“Don’t worry,” Max said. “I know how you can keep your job.” He pulled the gun from his pants and pointed it at Sam’s head.

“Max! What are you doing? Don’t shoot that in here! You’ll kill us both!”

“This is just for show. Look at them. Do you see that? Oh yes! They see the gun. If you take us to Williston, you’ll still get to keep your license. They can’t hold this against you. Plus, you’ll get to live.”

“Why do you keep threatening me?” Sam asked.

“Aren’t you listening? It’s not me. It’s them! You land where they tell you to, and they’re going to kill you.”

“You’re the one with the gun.”

Max yelled, “WILL YOU JUST TURN THE DAMN PLANE TO WILLISTON?”

“Okay, okay,” Sam said as he pulled on the stick and put them back on course to Williston. The other two jets scrambled.

“You’ll see,” Max said a little more calmly. “They can’t do anything to us. They would have done it already.”

Sam said nothing, looking straight ahead. He was shaking and sniffing. Max said, “Everything’s going to be okay. You trust me, don’t you?”

Sam answered, “I’m never going to see Sandra again, am I? I should have guessed something was up when you wanted to leave so quickly. I thought we were friends. I never knew it would come to this.”

Max didn’t answer because this struck him to his core. Only a few hours ago, he thought he had no friends, and yet here was one sitting in front of him.

For five years he’s flown this plane. How many discussions have we had in here? Why haven’t I ever thought of him as a friend? How many other friends do I have? I’m so stupid! This is why Lucy left me. I can’t see the people that surround me every day. Look at him. He trusted me, and would do anything I asked him to do. And this is how I repay him?

The other two jets returned and reassumed their positions around them. The one fighter pilot gestured with his hands. Sam interpreted, “He says this is our last chance.”

“Else what?” asked Max. “They’re bluffing. They need me.”

“What did you do? Why are they so angry at you?”

“They’re terrorists!” Max yelled. “I discovered their plot, and now they want to stop me from telling the world.”

“Terrorists? Really? Who are *they*?”

“Our own government. Clinton IV has even signed off on it. They’re planning to detonate nuclear bombs all over the world to kill off sixty percent of the population.”

Sam asked, “Do you really expect me to believe that?”

“Think about it! A secret government project in a secret bunker in Alaska? All those years they had me solving problems while keeping me in the dark? You just know they’re up to no good!”

“But why would they kill off their own people?”

“That’s the funny part. My math told them to do this. It’s the only way to save humanity, they say,” Max answered.

“So, what’s your part in this?”

Max said, “I’m going to stop them.”

Sam laughed and said, “Boy, you really are delusional! If this is really happening and Clinton’s behind this, then you can’t stop this. Think about it!”

“Oh, but I *can* stop this. I know the math behind what they’re planning. All I have to do is tell the world, and their plan fails. They’ll have to abort. They’ll deny everything to the world, and then they’ll let me on the team as a full-fledged member. They’ll finally listen to me, and we can find another way to save the human race.”

“I have no idea what you’re talking about! No one will believe you!”

“They don’t have to,” said Max. “Of course I’ll be ostracized. But according to the math, all I have to do is get the word out.”

“Yeah—that’s difficult, seeing how they’re jamming our signals,” Sam said sarcastically.

“You see? Why would they jam our signals if this isn’t true?”

Suddenly, the other two jets veered away and went back the way they came.

Max yelled, “What did I tell you! I told you they were bluffing. They’re not going to kill their biggest asset.”

Sam yelled, “Okay, will you put the gun away now?”

“Oh ... yes. I’m very sorry about all this. I never meant anything. I had no choice. You know I wasn’t going to shoot you.”

“Really? You held a gun to my head!” Sam answered angrily. “I have half a mind to turn back to Plentywood, anyway.”

“I hope you won’t,” Max said, trying to sound more relaxed.

“I don’t understand why you’re so bent on going to Williston, though. What does Lucy have to do with this? Whatever you did, they’re not going to give up this easily. They’ll know you’re going after her, and they’ll have people on the ground waiting for you.”

“I’ll figure it out. I just need to get her out of the city as soon as possible.”

“Oh no!” Sam exclaimed. “You think they’re going to detonate one of those bombs in Williston, don’t you?”

“Yes, I’ve got about a week to persuade her to leave.”

“Are you crazy? Is there anything else you need to tell me? That’s your great plan—to go flying toward one of these nuclear bombs? That would explain why those jets left in such a hurry!”

“I can’t let Lucy die! I have to ...”

A bright flash of light filled the sky. It was so bright that Max and Sam had to close their eyes.

“What was that?” Max yelled.

After a long silence, Sam answered, “That would be Williston.”

“Lucy?”

The light subsided, and in front of them—a little to the right—a mushroom cloud lifted from the ground where a small city used to be.

“I’m too late,” Max said. His hopes were shattered. No one could have survived that blast. Lucy was gone. Without warning, her fragile existence was wiped out with the push of a button. In the name of math and saving humanity, two billion people were now dead. They never had a chance. Four billion more people would die over the next fifteen years. There was no way to stop it now, because it had already happened. In a matter of seconds, it was all over.

A spherical shock wave spread out from the blast. Sam pulled the stick as hard as he could to turn away from it. When it hit, the jet’s dashboard sparked all over and then went dark.

Sam yelled, “Great! That was an EMP! We’re dead now!”

“Can you glide us down?”

Sam moved the stick and said, “It doesn’t respond. ... Sandra, I’m so sorry.”

The plane lurched to the right. It kept going until they were upside down. Max, who wasn’t strapped in, found himself at the top of the plane. The gun slipped out of his pants and went sliding to the back. Then the plane righted itself.

Everything was in motion, now. It was everything General Bennington hoped for. They didn’t really need Max. He gave them enough to get started. Certainly they kept enough mathematicians alive to finish his work.

How many did they lose, though? They couldn’t have had everything in place so quickly. Were all the important people in all the right places? Max wasn’t.

The plane spun faster and faster. There was no more sense of up or down. Max hit his head against the controls of the plane and blood oozed. Everything was a blur. Yet, everything was clear.

What are they going to do without me? Will they survive what comes next? I made them pull the trigger too quickly, but I'm sure they'll figure it out. It might take more than a millennium, but they'll get there. Yes, I see it now. Those problems they gave me are all coming together. There really is no other way. They really did try everything, and this is their last resort. My math is correct. We are now on the correct path.

Who was I to fight the math? I should have known better. It will all turn out for the best, and then thousands of years from now when we're roaming the stars, people will remember the one man who saved them all. No one will ever know that I ever went astray.