

# The Next Best Thing to Being There

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"We're coming up on Darkcrater Base now," the pilot of the moonhopper reported.

Eileen Peterson, Ph.D., leaned forward a bit so she could see better out of the window in the front of the lunar shuttle. Her first view of Darkcrater Base was not very impressive. The modules of all lunar habitats were invariably covered with heaps of soil for thermal and radiation protection, so the base looked like little more than oblong heaps of gray dirt. Here and there, though, an antenna or other projection poked through. Ramps led down to hatches and garage doors. At this low lighting angle, every little bump down there seemed to cast an inky shadow a kilometer long. As Eileen gazed downward, she hoped she was up to the challenge of diagnosing and treating whatever strange new kind of psychological malady was plaguing the inhabitants of this isolated installation.

"We did pretty good on the fuel consumption this trip," the pilot was now saying. "How would you like a quick fly-around before going in?" His eager grin would have made him boyishly charming even without the permanent cowlick his space helmet had given him.

"Yes, please."

The moonhopper's belly rockets flared as the pilot took it into a banking turn around Darkcrater.

Here at the South pole of the moon, where the sun never rose nor set, but merely skimmed completely around on the horizon once a lunar month, was a crater which never saw the light of day. In it lay deposits of water ice which were already ancient when life first began on Earth, and were there still, stubbornly refusing to succumb to the vacuum. Humanity was here to mine those deposits of ice.

The moon was now providing nearly all the raw materials for orbital construction. But most of the lunar surface was utterly barren of water. Every ore refinery in space was churning out oxygen by the ton, but hydrogen also was needed to make water. Not to mention rocket fuel. The hydrogen locked up in the ices here was a precious and valuable commodity.

The crater presented little of itself; merely a circular pool of impenetrable blackness. There wasn't much to look at until the hopper came back around to the crater rim. Now she could see the mass-driver which launched buckets of mined ice to Chaffee Base, another lunar station close to the equator. From there it was fired into space, to be used by the various orbiting industries.

Now they were passing over a gigantic solar panel which thrust up from a mountain peak near the rim of the crater. It was unlike any other Eileen had ever seen. It stood upright, like a immense billboard. Or better yet, like a movie screen from the kind of drive-in popular when her parents were young, only about twenty times bigger. It was supported on circular rails which enabled the vast solar array to track the sun as it passed around in a complete circle at the horizon. She never failed to be impressed by the colossal scale on which humanity could build structures in the moon's lower gravity.

Their spacecraft descended to a circular mooncrete landing pad built in a smaller crater which adjoined the base. Panels around the rim of the crater deflected their exhaust up into the black sky, so

that they did not stir up a spray of lunar dust. The hopper settled down on its four pneumatic legs, and then became still.

A small wheeled vehicle began rolling across the landing pad toward them. Eileen was suddenly startled, for at first she thought the driver was an unsuited man, exposed to the vacuum outside. But as the vehicle drew closer, she was fascinated to see it was not a man at all, but a remote. The remote was a human-shaped machine, remotely controlled via a technology called telepresence. Somewhere inside the moonbase was an operator who directed its every action out here on the surface. The robot-like mechanism moved with an uncannily human grace.

The remote backed the vehicle up to the hopper, and then got out to make a connection. Shortly later, the hopper was being towed to a docking station. Once the hopper was mated to the dock, and the airlock pressurized, Eileen was able to walk into Darkcrater Base.

She was met by Bruce Franklin. Eileen recognized him from his many interviews on television and in magazines. The father of Sky Bridge was wearing the same cream-colored jump-suit with the LunaCorp logo as everyone else here. The man was rather ordinary-looking. Strong jaw and nose made him look reasonably handsome. But today his looks were marred by a vicious-looking black eye.

He extended a hand. "Hi. Bruce Franklin: Engineering Manager for Darkcrater Base."

"Eileen Peterson with Harvard's Space-Psych Department. How do you do?"

Bruce was looking at her with the look of someone who was immediately and physically attracted. It was a look Eileen had gotten well used to over the years, and she didn't tend to let it bother her as long as everyone minded their manners.

"I've been told I might be some help to you here," she offered.

"I sure hope so," Bruce said. "Let's go to my office."

Eileen followed the base manager as he began moving through a connecting tunnel with the half-walking/half-hopping gate so typical in one-sixth gravity. While making their way through, they passed a spacesuited female who would have been quite pretty, save for the split lip. The pair entered a cylindrical module and then went into an office. Bruce casually vaulted over his desk and settled smoothly down into his seat. Eileen took a chair.

"What seems to be your problem here, exactly?"

"Well...it's like," Bruce hesitantly began, "It's like there has been an unusual incidence of violence here at the base."

Remembering the remote she had seen earlier, Eileen jokingly said, "I hope you haven't brought me out here to try and deal with the first genuine case of tele-murder!"

Tele-murder was the latest wrinkle in TV crime dramas. The murderer has access to a telepresence rig. While hundreds of miles away from his victim, he directs the remote to kill his target. Immediately afterwards, the killer makes certain to be seen by many witnesses, thereby establishing an alibi. Of course, if anyone did commit a crime of this kind, no one but the lawyer would attempt to argue that it wasn't the accused who actually performed the murder. The remote would merely be considered the murder weapon.

"No," said Bruce, smiling a little now. "Actually, I misspoke. I should have said we've had an unusual *pattern* of violence here. It just seems like people are quicker to come to blows anymore.

Instead of talking things out, there is a sudden tendency to launch straight into fisticuffs with very little in the way of preliminaries.

"It started out with little incidents not too much out of the ordinary," he continued. "Our first fight seemed to be over some kind of triangle thing, sexual jealousy, pretty typical stuff. I told all parties involved to deal with it like adults, and that seemed to be the end of the matter.

"Then Brad and Neil got into a boxing match in the mezzanine in front of the TV. Brad wanted to watch 'Star Trek: Beyond Our Galaxy', and Neil wanted to see 'It Takes One To Know One'. Now I'm starting to feel like a baby sitter.

"Next, Harry suddenly went berserk in the cafeteria. He jumped over the counter and starting beating on the server, all the while screaming 'No more tuna fish'!

"The last straw was when Sarah and Melissa started mixing it up in the women's shower room. Melissa accused Sarah of deliberately using up all the hot water. Fights in one-sixth gravity tend to move around quite a bit. Just about anybody can pick up a person and throw them half a dozen meters or more. Those two were down the hall and halfway into the Rec Room before we could pry them apart."

"Out in the hall... in their towels?" Eileen asked.

Bruce couldn't suppress a quick snort. "Well, part of the time, anyway!"

"And what about yourself?"

Bruce became quiet, and his eyes dropped. After several seconds he spoke. "Yesterday, my very best friend since college days, Reggie Deitrich, took a poke at my eye. We got into an argument over what was the best way to implement a repair on the mass-driver. It wasn't like the issue was anything emotional enough to belt anybody over."

"You do seem to have a serious problem here," Eileen agreed. "But it doesn't sound like the typical space isolation disorders. That's mostly depression, sometimes accompanied by a touch of paranoia. Not this type of... boisterous behavioral problems."

"Please," Bruce pleaded, "Don't tell me it's the low gravity. I've looked into designing some kind of moonbase which would rotate to bring the gravity up to one G. It looks like a giant roulette wheel. But even with magnetic bearings, the design is a real nightmare. I don't know if it can be made to work or not."

"Have you noted any type of pattern to the violence?"

"Well, it seems to cut across both sexes and all races," Bruce said while rubbing the back of his neck. "It did occur to me that it's affecting the working stiffs more so than the administrative types."

"Can I borrow your PC?" Eileen asked.

"Sure," Bruce answered, pushing the computer across the table-top to her.

"Command: Retrieve personnel records for all employees involved in altercations over the last two years and graph by occupation, Enter."

Eileen looked at the screen for only a moment before saying, "These incidents are mostly isolated to the ice prospectors and the mass-driver repairmen."

"What about these two - space suit maintenance and IR astronomy?"

"I think those are non-significant. In other words, you might have had two fights over the last couple of years whether there was an overall trend or not. And you wouldn't have thought anything of it."

"Got ya. In engineering, we would have called those two data points 'blips'. OK. So the common denominator seems to be those whose work is out on the surface."

Eileen turned back to the PC, and said, "Command: Graph by average hours worked per week, Enter." There was a distinct slope to the bar chart now displayed.

"I think we're onto something here," she said. "Those working the longest shifts seem more likely to be involved in the fighting. I can't believe it could be any kind of radiation effect. Surely something would have turned up long before now in workers who spacewalk regularly at the orbital manufacturing facilities."

"There's no way it could be radiation," Bruce insisted. "We monitor that very carefully. Besides, most outside work is done via telepresence. Not only does it keep the workers from being exposed to cosmic rays, but you can actually do better work than if you were encumbered with a pressurized space suit."

"Can't the space suits be made radiation-proof?" Eileen asked.

"If we did, you wouldn't be able to walk in them. Heavy protons can be very penetrating." Bruce pointed over his shoulder towards the curving wall behind his desk. "That's two meters of lunar soil piled all over this module. That's what it takes to stop them all."

"Doesn't anyone go out on the surface anymore?"

"Occasionally a job will come up which requires very fine motor control, and the worker just has to suit up and physically go there. But we try to limit everyone's exposure to the ambient radiation as much as possible. Plus, telepresence makes snack and bathroom breaks a little less problematic. Most jobs around here can be handled just fine by the remotes. The newest rigs are quite sensitive."

"Can I have a look at your set-up?"

"Sure."

Bruce led her to an adjoining module and into a room labeled "Telepresence Rigs". Inside was a strange spectacle.

Along one wall was a row of about half a dozen men and women encased in telepresence rigs. They looked like a line-up of skilled mimes clad in high-tech gear, each of whom had been impaled on a spear through the back. Each rig was mounted on a telescoping boom which ended in an enormous ball-and-socket joint in the wall. The rigs covered the upper half of each operator's head with an oblong helmet and the rest of the body in a complicated framework of mechanical joints and sensors.

The operators manipulated unseen objects with their outstretched hands. Their feet clambered over obstacles which were not there. Several walked or trotted in place. Eileen noted that when an individual seemed to be hopping from a higher point to a lower one, the entire rig swung down several decimeters. Sometimes they turned left or right a number of degrees. But there seemed to be a very slow, constant restoring force which gradually brought them back towards center, which was almost a meter up in the air.

One worker was clearly struggling with a wrench on a stubborn bolt somewhere out on the lunar surface, even bracing one foot on some wall or object for improved leverage. The bolt must have finally loosened, for now she was going through a perfect pantomime of turning an invisible wrench over and over. Another seemed to be climbing over a fairly-large boulder. One could gauge the size, and even a little about the shape of the rock, by the placement of the operator's feet and the occasional use of his hands to steady himself.

"It's extraordinary to stand and watch them, isn't it?" Bruce asked her. "You keep catching yourself looking for the objects they're holding and moving around."

"I was just thinking that!"

"That's the force-feedback. Those rigs don't just precisely measure every move these guys make. They also receive data on any type of resistance the remote feels and send that force back to the operator." Bruce walked over to a nearby wall and leaned against it with one hand. "If a remote was doing this, the operator's rig would exert just the right amount of pressure on his hand. He can actually 'feel' the wall. That's what makes telepresence possible. Without feedback, it would be like stumbling around with a body pumped full of Novocain."

Eileen was intrigued. She had been around trucker's telepresence rigs before, but those were nothing more than a stereo video/audio helmet linked to a camera-and-mike system which swiveled about in the cab of the truck. The driver still sat in front of a steering wheel and pedals. This variety of telepresence was the next step beyond that.

"Would you like to look at the Threepios now?" Bruce was asking her.

"The what?"

"Sorry," he said, grinning a bit. "That's a slightly more informal term for the remotes. Come over here."

At the other end of the room were three remotes. They leaned back on slightly reclined platforms mounted on castor wheels, looking like so many iron Frankensteins awaiting only the flow of current which they required to become animate.

Eileen could see the reason for the slang expression. The remotes did look very much like the science fiction conception of a human-shaped robot. Camera lenses were mounted where eyes would be, and microphones stood in for ears on the sides of the head. There was even a speaker grill in place of a mouth. The shoulders and hips were ball-and-socket joints; the knees and elbows, hinge joints. Rotating joints were located in the middle of the upper arm, wrist, thigh, and ankles. Each metal body had a flat white finish, and seemed clean and well-maintained, though covered with numerous dents and scrapes.

"I bet you'd like to see one in action, huh?" Bruce asked, and then walked over to one of the eyeless operators.

"Hey, Castellano, can you stop what you're doing a sec?"

The man continued to move in his rig, totally immersed in his work and oblivious to his real surroundings.

"Moon to Castellano, come in please!"

"Yah, what? What do you want?" he finally responded.

"I'd like to switch you over to remote number eight. We've got a VIP in here who'd like to see an active remote."

"OK. Just a second."

The operator carefully set down an invisible object he had been carrying, and then stood back up.

"Ready."

"OK, here you go."

One of the remotes at the other end of the room thrashed, lurched briefly, and then turned its head to take in its surroundings. With the casual grace of any living thing, it then stepped off the inclined platform and walked over to where Bruce and Eileen stood. Now she could see how the remote precisely mimicked every movement the operator made. Viewing one of the "Threepios" in motion made Eileen realize that her initial impression of these metal men as Frankensteins was inaccurate. This was no clumsy collection of mismatched fleshy parts, but instead a well constructed, smoothly functioning, mechanical recreation of a human being.

"Hello, how are you?" it (or rather Castellano) said. The remote extended a hand in greeting. Eileen was a little trepidatious as the hydraulically-driven steel hand closed around her slim, human one, but she felt nothing more than friendly pressure well under control.

"It must be a bit disconcerting, getting 'switched' from one location to another like that," she said, addressing the remote instead of the rig-covered operator.

"Yeah, it's a little like getting 'beamed' from place to place," said a voice emanating from the head of the remote. "It's kind of weird at first, but," metal shoulders shrugged, "You get used to it."

Eileen was fascinated by this close-up look at this new, rapidly developing technology. She remembered reading that the Mont-de-Marsan reactor might never have been brought back under control were it not for the remotes which could work inside the deadly atomic core. Telepresence had been used in the development of the ocean floor, and now it was doing the same thing for space.

When she was a little girl, Virtual Reality was the buzz-phrase everyone was excited over (even before it had arrived properly). Nowadays, VR was largely relegated to shopping mall game rooms (and a few of the more well-moneyed schools and universities) and it was VR's less glamorous cousin, telepresence, which was entering the workaday world in a big way.

The remote Castellano had re-animated was now back on its platform, and the operator's soul had transmigrated back out onto the lunar plains, back to his work.

"Do you have any VR programs up here?" Eileen asked Bruce.

"Just one. It's called 'EarthWalk'. We have it because it's a very practical and therapeutic form of recreation. It simulates a walk in a variety of terrestrial environments. But more than that, it even uses the force-feedback capability to simulate the increased gravity. The rig stresses the muscles and bones with the same loads they would experience in a one-G gravity field. Or if you want, you can start out at one-sixth of a G, and then gradually increase to a full G as you progress through the walk. So it's great exercise for anyone scheduled for return to Earth, or to a one-G station. Why do you ask?"

"I was just remembering some studies on the effects of habitually playing the more violent VR games. It was blamed for an increase in hostile behavior. They call it 'Mortal Kombat Syndrome'."

"I wouldn't swear that anyone couldn't smuggle any kind of software they like up here," Bruce admitted. "But if everybody was doing that, it seems like we would have caught someone at it by now. VR is pretty immersive. It's not like whacking the escape key when you hear the boss approaching your cubicle."

Eileen stood in thought for a moment. Then she said, "There's only one way I'm going to get to the bottom of this. I've got to experience everything these workers experience in order to understand what's happening here. Can you arrange for me to try this telepresence?"

"Sure. I don't see any reason why we can't do it right now if you want."

"Don't I need some kind of training?"

"Do you know how to walk, pick up objects, and move around?"

"Yes."

Bruce shrugged. "Then you can do telepresence. That's the beauty of it. But let me just say: If we get into an argument after I pull you out of the rig, and you pop me in my jaw, it'll just break my heart!"

Eileen smirked at Bruce good-naturedly while he walked her down to near the end of the row where there was a vacant rig. Its boom was angled downward to where the stirrups of the rig rested on the floor. Eileen stepped into them. Bruce, aided by a technician, began cinching down Velcro straps over what seemed like every portion of her anatomy. Telescoping joints obligingly contracted to accommodate her small frame. She guided her fingers through the many series of frame-mounted rings which comprised the "gloves" of the rig. The technician held a pair of calipers up in front of her eyes and squinted at her. He seemed to be measuring the distance between the pupils of her eyes.

"Five and a half," he said to Bruce.

Bruce adjusted a knob on the helmet, and then swung it down over her head. Eileen was enveloped in darkness. The massive helmet didn't seem heavy. In fact, no part of the rig weighed down on her. The array of hydraulic actuators and position sensors seemed to support itself all around her.

"Ready?" asked Bruce in a slightly muffled voice.

"Let 'er rip."

Eileen felt herself rising up about a meter off the floor. Now her body was being gently guided into a slightly inclined position, legs straight, arms at her sides.

Suddenly, she found herself on the lunar surface.

The view of the moon's landscape was three-dimensional and crystal clear. She raised her hands up in front of her eyes and marveled at limbs somehow transformed into gleaming steel.

She was lying back on the same type of wheeled platform she had seen back at the control room earlier. Correction: She was still in that control room. It was amazing how quickly she had fallen into thinking of herself as physically in another place. She leaned forward and stepped off the table.

The lighting of the gray landscape all around was eerie. The sun was at such a low angle that, despite its brilliance, much of the land was hidden in pools of blackness. Not even the nearly-full Earth helped much. It too lay at the horizon.

Eileen turned around to get her bearings, then craned upward at the distant solar power array which reared straight up into the ebon sky.

"That's some solar panel you've got there."

"Yeah," came Bruce's voice to her from back in the control room. (No! She was not two meters away from him!) "That's one other advantage of being at the South pole. We're the only moonbase which doesn't need a nuke buried in the backyard to get us through a fourteen-day-long night."

Eileen decided the mass-driver looked interesting, and decided to walk off in that direction for a closer look. She was a bit clumsy at first, stumbling several times. She could "feel" the rocks beneath her metal feet, but only as irregularities in the surface. It was like walking in a very light, but impenetrable, suit of armor. In time she got the hang of it, and began walking more gracefully.

She was at the beginning of the mass-driver now. A framework supported a countless series of hoops which converged toward a point on the horizon. Every few seconds she could glimpse a bucket silently darting through the hoops and accelerating away toward that vanishing point. Eileen appreciated that if she were only a few dozen meters further downrange, she would not be able to perceive the speeding buckets at all. They would be moving far too fast for her eyes to register.

"I'm looking at your mass-driver now."

"Yes, that's a pretty unique design," Bruce said proudly. "Unlike most mass-drivers, it doesn't snap the bucket to a halt at the end, ejecting the contents out. Both the ice and the bucket it rides in get shot out the end. The bucket flies a quarter of the way around the moon, and then into the mouth of another mass-driver at Chaffee Base. It gets decelerated, and then the ice is dumped out. We do this for about a half hour. Then for the next half hour, Chaffee fires empty buckets back at us. We capture them, reload 'em with ice, and the whole thing starts all over again."

Now Eileen was heading for Darkcrater. On the way there she came across a peculiar sight.

There was, as Rod Serling would say, a sign-post up ahead. It had four arrows pointing in the four directions of the compass. Each was labeled "North". This spot, presumably, marked the exact location of the moon's South pole. But wait, there was a fifth arrow. It angled toward the point on the horizon where the Earth sat. The lettering on this arrow, which was in a different handwriting, read "Anything anybody ever really cared about". This plaintive graffiti, if nothing else, gave her some insight into what was going on in the minds of the men and women of this moonbase.

She reached up and touched one of the arrows of the sign. She could "feel" the arrow between her fingers. When she moved her arm, she could feel the sign wobble in her hand. Incredible.

Eileen continued onward, following her grotesquely-long shadow to the rim of the crater. She passed over the gently curving lip, and descended into darkness. The only illumination, save the stars, was from the thinnest sliver of the crater rim opposite the sun, and it was precious little. She was grateful for the lights mounted on her arms and the one on top of her head. (No! Inside her head! The beam emerged directly from the middle of her forehead.)

Following what seemed to be the densest concentration of footprints, she eventually came to yet another sign. Shining a light on it revealed, "Have you ever been told to stick it where the sun don't shine? Well, this is it!"

The riot of footprints led her to the mouth of one of the ice mines. Intrigued, Eileen entered.

"Looking for some ice?"

Bruce's voice startled her briefly, for it seemed he was there in the ice mine beside her. (No! No! No! *She* was there next to *him* in the control room.) Eileen finally decided to give up trying to remind herself it was not really "her" exploring the lunar surface. She would go along with the electronic fiction that "she" was in a place other than where her flesh-and-blood body resided. What was consciousness other than a point of view, after all? Philosophers could debate this for eternity. For now, she would accept that Eileen Peterson was here in the mine.

"Um, yeah," she stammered. "You must be watching my 'vision' on a monitor."

"That's right. Go in a little bit deeper. OK. Now turn to your left. Lift up one of those large boulders and look underneath."

Eileen heaved at a rock the size of a laundry basket. It tipped upward with astonishing ease.

"Bruce, I know this is one-sixth gravity and all, but should I be able to pick this up this easily?" she asked.

"Well, the gain in the system starts out at unity, but the force-multiplication factor can ramp up a bit if you really put some 'oomph' into lifting something or whatever."

"Bruce, please. You're talking to a clinical psychologist here."

"Sorry. Um, your strength starts out at human-normal, but it can go up if you need it to."

Eileen's first look at lunar ice was a bit of a let-down. She had expected it to sparkle like diamonds, or at least gleam like gold. But despite its status as a precious substance, the ice of Darkcrater did neither. It merely looked like more of the ubiquitous gray, powdery grains, only cemented together into irregular clumps.

She picked the boulder all the way up, and then gave it a playful toss. It soared through a slow parabola in the reduced gravity, and then silently crashed down against the far wall of the cave, knocking stones from the wall. Several rock chips ricocheted back at her, clattering harmlessly off of her stainless-steel body. She picked up another rock, even bigger than the one before.

"Hey, look at me. I'm Wonder Woman!"

"Uh, Eileen, can you kind of take it easy..."

This exuberant throw grazed the ceiling of the mine. Suddenly a hail of dislodged rock was pouring down all around her. Unstable ices of methane and ammonia were flashing into vapor, causing yet more rocks to come unglued and rain down. Eileen could not feel their impacts on her iron body, but they were pummeling her, forcing her down. If Bruce was watching all this, she couldn't understand why he was not crying out in alarm over her situation.

When the cave-in finally subsided, she found her right arm pinned under a pile of rubble. Try with all her might, she could not pull the mangled limb free. Eileen began to thrash around, trapped. She could feel panic's approach.

Then, warm, invisible hands from nowhere were cupping themselves around her cheeks and neck. The human contact was both comforting and reassuring.

"Eileen," came Bruce's voice from somewhere nearby. "Remember, you're here with us, you're not

there! You're not really trapped!" Eileen felt the panic retreat, like a predator slinking off when it realizes it's been cheated of its prey.

"The issue is not whether you can get away or not. We can shut down the rig and pull you out of it right now. The only issue is if you can bring that remote back on your own, or if I have to put one of my men in your rig to handle it." The phantom hands pulled back into the elsewhere from which they came.

"I'd like to bring your 'Threepio' back to you," Eileen said irritably, "But I can't get my arm out. I don't think it's working properly."

"No it's not," Bruce agreed. "You might as well go ahead and tear your arm off."

"Excuse me?" she said skeptically.

"The Threepio. Try to take the Threepio's arm off."

Eileen began gingerly tugging at the metal sinews which still connected her arm to the rest of her. It was difficult work because it seemed there was some invisible, rubbery force-field surrounding the gaping wound. It took her a second to realize that it was her "real" fingers bumping against her "real" shoulder. But eventually she was able to tug herself free from the rubble pile.

Silent with chagrin, she guided the robotic amputee back out of the mine, up the gradual slope of the crater, and finally back to the platform where her adventures had begun. She settled back down upon it.

Almost immediately, the stereo helmet was lifted from her head, sweeping the lunar landscape away with it. Cool breezes touched her sweat-dampened scalp.

Bruce was there at her side. "This may start that argument I was so worried about earlier," he began, "But I'm afraid this is the last little jaunt into telepresence you're going to make on my base. You're just too rough on the equipment."

"There's no need," Eileen panted. "I know what's causing the violent behavior now."

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Several hours later, Eileen and Bruce were again in his office.

"The problem is," she began, "These telepresence rigs do an excellent job of convincing you that you really are out there; that 'you' are the remote. But they don't transmit pain back to the user. Sudden impacts or shocks are 'felt' in the sense that you feel yourself being moved around by them, but they don't hurt. After many hours of use, one could develop a sense of invulnerability. Maybe I'll call it a 'Man of Steel Complex'.

"There's only one thing keeping us from immediately flying into physical conflict with someone whenever we're frustrated or upset. Physical fights have a cost. You can get hurt. That's why we adopt other strategies for dealing with conflicts, like bluffing, or trying to talk things out. But if you are convinced of your own invulnerability, there's no reason to hold back.

"We misinterpreted the data," Eileen continued. "It wasn't so much those working the longest hours who were most likely to be involved in the violence. It was *those who were requesting the most overtime*. They were coming to genuinely enjoy their sessions in telepresence. They were getting off on the feeling of invulnerability and strength it conveyed to them."

"So what do we do about it?" Bruce asked, hands spread.

"Well, I wouldn't worry a whole lot about those already affected. If you look at the data, you'll notice no one is getting into fight after fight. They come to blows once, and that's it. The feeling of being the 'Man of Steel' is punctured. They re-learn the lesson of the playground. I don't think you'll have any repeat offenders. But to keep from constantly having new cases, you're just going to have to figure out a way to make the remotes reflect pain back to the operator. Don't some of the combat-oriented VR programs shock the player to simulate a hit?"

Bruce was stroking his chin. "Gosh, I hate to think what the media would have to say about LunaCorp administering electrical shocks to its employees. But wait a minute. I don't think those VR games use electricity. I think they use vibration. You get a 'buzz' in the area of the body hit. We could do that by mounting tiny electric motors all over the rigs with off-balanced weights on them. Our machine shop could do that in a jiffy."

He began smiling now. "You know, this might solve yet another problem we've been having here. Don't think you're the only one to come limping back with a Threepio all torn to pieces. If we do this, maybe it'll encourage those jokers to take it easy on these things!"

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The next week, Eileen was crossing the hatchway into the docked moonhopper which would take her back to Armstrong. One of the two passenger seats was occupied by a remote. Its head came up brightly at her approach.

"Hello, Eileen!" it said with a familiar voice.

"Bruce?"

"Yeah, it's really me."

"What are you doing here?" she asked without irony.

"I was wanting to accompany you on your hop back to Armstrong, but I have a meeting at ten and the shuttle wouldn't get back until after noon. So I'll ride along with you like this. They can bring the remote back on the next hop."

"So how're the rig re-fits going?" she inquired, settling down next to the metal man.

"Finished. The workers are complaining bitterly, but the remote repair crew is starting to foresee themselves getting caught up on their work for the first time ever. So they're happy, and I'm happy." An iron-alloy hand placed itself upon hers. "I just wanted to thank you personally for all your help with this."

"Why, Dr. Franklin," Eileen said with mock seriousness, "Are you trying to come on to me? Isn't that rather pointless given the present circumstances?"

"I don't know," the Threepio said, inclining its metal head closer. "I might give you a reason for preferring a body of steel over a flesh-and-blood one."

Her bemused smile never faltered for a second as Eileen reached up and gave the robotic proxy a playful, open-handed pop on the jaw.

"Hey," Bruce said, jerking back with a hurt expression in his voice.

"Just so you don't forget!"

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**The End**

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