

# *THE MARS FRONTIER*

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*Voyage of Discovery*

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1.

## Ball Game

early Jan. 2059

*“La vostra partecipazione a Progetto del Nuovo Mondo porterà grandi benefici a tutta l’umanità. Grazie.”* Will Elliott repeated the last sentence of the Italian version of his “stump speech” slowly, carefully, deliberately. Reading the speech at about one third his usual speed, his accent really wasn’t bad. Computerized editing would take his ploddings, squeeze out the extra time, add rhythms and intonations from his English version, and produce something that made him sound almost like a native speaker. Such was the power of mid twenty-first century computer technology and the cultural expectations that drove it.

He paused to look at the 3-d screen on the wall near his desk. It was set on “porthole” mode; he could see Earth in the middle, about a third the diameter of the moon as it appeared from Earth. They were still a million kilometers out, a day from aerocapture into an elliptical orbit around the home world. The image looked real; the half that was illumined by the sun was even so bright that it made his eyes water slightly.

He wasn’t in the mood to tape the German version of his speech. It all felt slightly dishonest to him; never mind it was now standard procedure. As someone had recently quipped, even the President of the United States now had to look like he could make speeches in perfect French, and the President of France reciprocated with speeches in excellent English, usually without computer assistance. The Commissioner of Mars, representing most of the cultures of the world, could do no less.

But instead he glanced around his small room that had been the Commissioner's bedroom and office for the last 184 days. It wasn't much to look at; it was three meters deep and four wide. On the voyage home he'd have even less space because the vehicle would have five times as many passengers. It had a bed over the desk, which had drawers for his clothes as well as for office items; in addition to his chair, the room had a folding chair for a guest. A tiny closet held his six changes of clothes. That was it.

The videophone beeped, indicating an incoming call from Earth. Now that they had passed the million kilometer mark, round trip communications had dropped to six seconds, allowing easy, spontaneous calls.

He activated the videophone and could see that Louisa Turner, the Mars Commission's Director of Media Relations, was calling. She was perfectly quaffed, as always, looking much younger than her 70 years. "Hi Louisa," he began.

"Hi Will. Boy, the time delay is almost something one can ignore. But I had better continue to talk in big blocks, so we don't interrupt each other. We've added three more sentences to your standard speech based on your comments yesterday. Don't worry if you've taped one or more language versions; you can tape the addition and we'll edit it in. Most of the time the press will only select a few sound bites anyway; you'll deliver your speech in English and they'll play your translation of the pieces they want.

"The interview with Ted Chappel has been delayed; he'll be calling you at 6 tonight. This is a major late-night news analysis and interview program with about thirty million viewers in the U.S. and Canada, with another million in South Africa over a cable station. It'll be broadcast the night after you land at Kennedy. I sent him the suggested questions and he was touchy about them, but a friend of mine who arranged for an

interview with a political candidate told me he'll end up using a lot of the questions anyway. A lot of reporters, even good ones, are lazy. It makes my job easier.

“We have three requests for interviews with Marshall. I've explained that you don't want him interviewed, but that hasn't worked; the media smells a big human interest story. We're talking about a handsome, articulate 19 year old who was the first child born on Mars, especially when you consider that practically every sleazy tabloid on Earth ran a story about his birth that implied he was genetically deformed or the offspring of an alien. Marshall's stuck; he has name recognition. So you need to tell me how we'll manage that.

“As for diplomatic meetings, it appears the White House invitation will fall in the middle of your vacation in Stamford and there's nothing we can do about it. The President's schedule is less flexible than yours.

“Over to you now.”

Will had to smile at her “over.” “Thanks, Louisa, but with a six second round trip, let's not use ‘over’! I'll tape the additional sentences. I completed the French and Italian versions. Okay with the Ted Chappell interview and the meeting with the President. But I really want to protect Marshall as much as possible. He has no idea what to expect. I'm willing to have him in some interviews with me, but not separately. Maybe that will work. I know MIT has agreed to protect him from the media as much as possible, and I hope that will be good enough.

“Do I have to tape these silly multilingual versions of my speech? This entire effort has the feel of a political campaign. Can you be sure to label the French, Italian, German, and Spanish versions as ‘computer edited’ or something? It just feels wrong.

I've been watching foreign leaders speak in clear English for several years and never noticed that it wasn't spontaneous. Back to you."

He waited a few seconds, then she replied with a laugh. "Will, you and a few old people and everyone under age 5 think the English is real! Everyone else on Earth knows it isn't. There's no need to tell people. We have to collect together all these cultural differences between the worlds and publicize them; they're great human interest material.

"As for this sounding like a political campaign, that's how publicity trips are arranged. The coordinator of your trip was an assistant director of the Democratic Presidential campaign some time ago; a campaign they won. Everyone has a standard speech that they use and reuse, a speech that reiterates the basic points they want to make. Your standard speech does exactly that: Mars is humanity's future, Mars will take us to the stars, Mars is a family-friendly, moral and just place with no poverty or war, Mars has vast natural resources, Mars will teach us how to live together as a species, Mars will usher in a new civilization, every nation must send a proportional number of colonists; it's a great, upbeat, optimistic message, and like a typical political speech it has elements of truth in it. Yes, it practically makes you sound like you're running for President of Earth, but don't worry, they won't create the position for you, and meanwhile Mars will end up with billions of dollars of more support long term. *And that's the point.* You're meeting at least twelve heads of state, several hundred government officials, representatives of twenty space agencies, you're attending a special Mars Exploration Society conference, you're convening the Mars Landowners Assembly in Houston, you're hosting a Mars Development Conference in Berlin. . . all to sell Mars.

“As for Marshall appearing in interviews with you, that has a lot of potential. I’ll work with it. It’s a reasonable compromise and will give him some experience if the public interest continues after you leave.

“That’s all I had for you. Anything else for me?”

“No. Thanks, Louisa. You’re a million.”

“Thanks Will. I’m looking forward to meeting you for the first time in about forty-eight hours. Bye.”

“Bye.” Will closed the circuit and paused to reflect about how money was an unfortunate necessity for everything. At least the optimistic, almost utopian speech reflected his own vision of Mars’s future; it was the reason he could sell the place.

Marshall popped into the doorway suddenly after jogging down the hallway. “Dad, the last zero-gee volleyball game of the voyage starts in ten minutes. The gym closes at 4 p.m. so that it can be stowed for aerocapture.”

“Oh?” Will glanced at his chronometer; it was 1:49 p.m. “Okay, I’m on my way. I can’t pass up that opportunity.” He rose from his chair, closed the door, and quickly changed into gym shorts and a t-shirt, put on sneakers with velcro soles, then took the elevator up to the hub of the rotating spacecraft.

The elevator moved slowly so that he could adjust to the waning gravity. When the door opened he was virtually weightless. He leaped along the wall to the docking module, where he could enter the zero-gravity gym. It was a simple plastic cylinder thirty meters long and ten meters in diameter. Several crew members were moving equipment around in the docking module; they were preparing for an extravehicular excursion in two hours to stow the gym.

He floated into the gym. Dividing it in half was a donut-shaped volleyball net, a 2.5 meter-ring around the perimeter of the cylinder with a 5-meter hole in the middle. Sixteen of the twenty-three people on board were there; perfect for two teams of eight each.

“No, dad, the other side,” said Marshall, pointing to the opposite side of the net. “I don’t want too many old guys on my team.”

“Alright, we’ll kick your ass,” replied Will, amused and irritated by his son’s comment. He was 55 years old but in excellent physical shape. He floated through the hole in the middle of the net to the other side.

“I think he’s stacking the deck,” replied Brian Stark, who was 49 but in worse physical shape than Will.

“I wouldn’t be surprised. So, will you be in D.C. on the 13<sup>th</sup>?”

“Is that the date of your visit? Last I heard, it wasn’t confirmed. Yeah, I’ll be there. I’ll have to sound like I’m on their side, remember.”

“Brian, you *are* on their side! But that’s okay, the negotiations will be productive.”

“Oh, I’m sure they will be.”

“Where are you going for the month?”

“Other than D.C., I’m spending two weeks with my brother and his family in Seattle, which is where my dad is as well. I’m getting to Los Alamos for a week, too. I’m flying straight to a resort in the Bahamas for five days.”

“Oh, that’ll be nice.”

“Okay, let’s get started!” exclaimed Gaston Gilmartin. He grabbed the volleyball and floated to a velcro patch on the rear wall of the gym cylinder. Everyone else made sure their feet were anchored to one of the velcro strips that ran along the cylinder walls. Zero-gee volleyball did not allow anyone to anchor to the rear wall, except the server. The scoring system was different from volleyball on earth: The ball could bounce once against the side wall before being hit back, but if the ball hit the rear wall, it was a point.

Gaston served the ball. It soared through the central hole in the net and Brian leaped from his velcro anchoring spot to intercept it. He hit it, pivoted his feet around, and landed on a velcro strip covering part of the opposite wall, but the ball hit the net. Score, 0:1. The ball went back to Gaston and he served it again.

That time it went back and forth three times. Finally Will was able to return it while still anchored, which was the best situation; unanchored and floating through the air, it was very difficult to control the return. He spiked the ball back through the hole and it bounced off the side wall, then the rear wall, gaining a point for his team. “You see, what did I say?” he said to Marshall.

The game continued in that spirit for the next half hour. Several quit, making it five on five; the others floated in the access tunnels to watch. Will was reluctant to leave since this was their last chance to play for over a month, though he sometimes rotated out to watch for a while. Finally at 4 p.m. it was time to quit. They all helped take down the net and empty out the gym cylinder.

Will and Marshall went back to their adjoining rooms. Will filled a bucket with three liters of warm water, took it to his room, and used it to wash off the sweat. Then he dressed and went back to his video and electronic mail.

At supertime he walked to the dining area. Dr. Forest Rivers beckoned him over. Rivers never played volleyball and was reclusive. “Hey, Will, any possibility you can come through Vancouver? I’d love to show you our community.”

“Thank you, but no, that’s not possible. I’ll be in Toronto for half a day, then I stop in Ohio and head for Houston for two days, then I stop in Los Angeles for a day, then off to Australia! It’s all very tightly planned.”

“I’ll follow your world tour on t.v. It’s a shame. The Green World Community would welcome you warmly.”

“I’m sure.” Will knew Rivers’ new-age community was fairly sophisticated at getting media coverage; a visit of the Commissioner would bring vast amounts of publicity. “Your people must be looking forward to seeing you, after four years.”

“Yes, they can’t wait. Neither can I. I’ll be touring six of our seven communities on Earth, then back to Mars with another dozen members.”

“Aram’s turning green.”

“Yes, we’re proud of what we’re doing there, and we need more folks on Mars, so we’re glad to be getting them. We’ve got to sell more food to you! Aram’s got great mineral resources, too. We want to start trucking gypsum to Aurorae, and we have some handsome building stone that the Outpost could use for building façades. We make some of the handsomest brick structures on two worlds. Our mother community outside Vancouver is building a structure similar to Aram’s.”

That’d be nice to see. I’m looking forward to miles and miles of open space and the outdoors. I hope to go swimming in the sea at one point and maybe skiing. I hope to see a jungle, too.”

“You may not get back to Earth for a while.”

“It won’t be another twenty-two years; maybe four or six.”

“I’m planning to commute back and forth every four years. It’s cheap and fast enough to make that practical.”

“I’m not sure about ‘fast enough’; the round trip takes thirteen months!”

Gaston came along and joined them at that point. He spoke of visiting his family in southern France and a speaking tour about Mars he was embarking on. All twenty-three of them had been on Mars at least eight years and had family to see, shopping to do, and talks to give. For the next month, Mars would be assaulting the television studios and auditoriums of Earth.

Will enjoyed a long supper, then headed back to his quarters. Marshall stopped by a short while later. “I’ve got to pack, still.”

“Me, too. We’ve got time, though. Say, let’s sit together and say some prayers.”

“Okay, that’s a good idea. Let me get my prayer book.” Marshall walked over to his room and returned with his Bahá’í prayer book.

They took turns reciting prayers, three each. “It’s nice to say some prayers before aerobraking,” Marshall said when they finished.

“Yes, but I’m concentrating more on the entire visit, not the arrival. I’m not worried about aerocapture or entry or landing. We’re going to a strange place. Even if we’ve seen this world on television every sol, it’s going to be strange.”

“Even for you?” Marshall was surprised.

Will nodded. “It may be as strange for me as for you. The culture has changed a lot in twenty-two years. All sorts of basic things have changed. I don’t think I could drive a car, even if I still had a valid driver’s license.”

“You don’t have to; the car will drive itself.”

“True, but I don’t know how to program it! So many simple, basic things in the day-to-day culture are different. And I’m worried about you.”

Marshall smiled. “Dad, don’t worry about me. I know about pickpockets, pimps, beggars, and muggers.”

“You know about these things intellectually, but that’s not the same. You’ll see. You have to *feel* all these things.”

“I can’t wait,” he replied with a smile.

“That’s why I worry!”

Marshall laughed. “I won’t go off the deep end. Don’t worry!”

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They reached Earth the next morning. Everyone was strapped into their seats and ready. An hour before aerocapture, the ship stopped its internal rotation. Gravity ebbed away as the rotation rate dropped steadily from seven revolutions per minute—enough to make 0.8 gees on the outer floor—to nothing. On the dorsal surface of the *Polaris*, the zero-gravity gym was completely deflated and compressed against the hull where it was safe from superheated plasma. The solar panels and cooling radiators were stowed. Then the *Polaris* fired its engines to slow down by 16,000 kilometers per hour, because it was moving too fast to burn off all of its speed in the atmosphere. Steering fins were deployed to direct the vehicle as it passed through the upper atmosphere.

They went from weightlessness to considerable weight in a matter of a few seconds as the ship hit the atmosphere at 74,000 kilometers per hour. The very high-speed passage from Mars to Earth now brought the penalty of a fiery entry and deceleration at up to 6 gees. But the chest-compressing, breath-snatching pressure lasted less than six minutes. The vehicle fell to within sixty kilometers of the Sahara Desert, then flew out of the atmosphere at 39,000 kilometers per hour, just short of escape velocity. It put the ship on a trajectory that would carry it to Gateway Station, a collection of interplanetary transit vehicles and modules that served as earth's chief interplanetary transit hub, resting on the gravitational watershed between the Earth and moon.

The aerocapture maneuver was performed with great precision; within half an hour of their departure from the atmosphere the ship fired its engines and accelerated itself by 1.68 meters per second, putting it on exactly the expected course. Meanwhile, two twelve-passenger Swift-C shuttles were on looping elliptical orbits with perigees of 400 kilometers and apogees of 100,000 kilometers; they were just a few kilometers ahead of the ship, and the ship's higher velocity brought it closer and closer to the shuttles every hour. By noon the four vehicles were flying parallel just half a kilometer apart, and the shuttles were firing their engines to close the gap. At supertime the shuttles fired their engines again to match the ship's trajectory precisely; at that point they were only a hundred meters away. The first shuttle docked to the ship at ten p.m. half the crew transferred over. By 1 a.m. the second shuttle had docked and picked up its load of passengers as well. The shuttles had brought the ship's new crew and some of its passengers for the flight to Mars next month. One by one the two shuttles fired their

engines to cut off their apogee and head back to Earth. One shuttle was aiming for Kourou in French Guiana, the other for the Kennedy Space Center in Florida.

Will, Marshall, and the other ten personnel heading for Kennedy slept in their seats in the passenger cabin. When they awoke they were falling rapidly toward Earth and the crew was preparing for atmospheric entry. They ate no breakfast; their stomachs might not appreciate a meal in the next two hours of flight.

Their second entry into the Earth's atmosphere over the eastern Pacific was longer, but less intense. The shuttle blazed across the sky, heating the air into plasma, slowing steadily as they progressed eastward, passing over Mexico, dropping lower over the Gulf of Mexico, passaging high above the Mississippi River delta, finally dropping precipitously toward the ground over the Florida peninsula as they passed below the speed of sound. Their weight peaked at almost three gees, then dropped to almost earth normal, at which point their main distraction was the need to pop their ears constantly as internal air pressure rose to match sea level pressure. They saw Orlando at the height of a very high commercial aircraft. Then the shuttle's parafoil deployed, slowing it further and giving the wingless lifting body the characteristics of a subsonic aircraft. It descended more gradually, but steadily toward the shuttle runway at the Kennedy Space Center. Finally, the landing wheels extended and the shuttle touched down smoothly. It rolled to a stop just fifty meters from the shuttle arrival terminal. A truck drove over and towed it to the jetway.

The twelve of them began to disconnect their safety belts and rise. Marshall stood in a wobbling way. Will wobbled a bit as well. "Earth gravity."

“It feels more than 0.8 gees, even when I was wearing weights.” Marshall put his hand on his mouth. “Wow, my voice is loud!”

Will laughed. “Yes, it’s a strange experience for me, too. We’ve been speaking in 0.3 atmospheres of air pressure for two decades. No wonder people complain that Marsians are loud.”

“We are loud!” exclaimed Marshall.

They grabbed their personal gear and headed for the airlock door while the jetbridge was moved into place. The door opened. Everyone insisted that Will be first, so he took his bag and led the way down the jetway. It was a strange experience, so different from his landings on Earth over two decades ago, which involved an immediate transfer to a medical area for observation. They needed no checkup on arrival this time.

At the end of the jetway stood the Vice President of the United States, Ruth Urlacher; the Administrator of NASA, Darius Rosen; the Vice Commissioner of the Mars Commission, Pierre Messier; and the Director for Public Relations, Louisa Turner. Will smiled when he saw Louisa; it was the first time he had actually met her. But he was particularly struck by the Vice President, who was dressed in a way that was as highly sexual as it was elegant—he didn’t think such a combination was possible—and who barely looked the Constitutionally required minimum age of 35.

“Dr. Elliott, welcome back to the United States of America,” she exclaimed in a silky, almost husky voice.

“Thank you, Madame Vice President,” replied Will, and they shook hands. He shook hands with the other three, then Will introduced the other eleven who had arrived in the shuttle. Will turned back to Louisa. “It’s delightful to meet you face to face.”

“The pleasure is mine. Are you ready for the arrival ceremony?”

Will nodded. Introductions over, their personal property transferred to others, the Vice President led them through the terminal to the new auditorium gracing its far end. She walked next to Will. “I hope you enjoy your visit home to the U.S.”

“Thank you, it’s quite exciting to come home. I haven’t seen my mother for 22—”

“I gather you’ll be in Washington as well, in three or four days,” she added, interrupting. “Looking forward to the negotiations.”

“Thank you.”

“I doubt we can give you anything you ask for, not unless you can give us something in return of course.”

“Of course.” He was startled by that comment. The hardball had begun.

Someone opened a door for them and they entered an auditorium filled with over a thousand people who immediately stood and cheered. The party walked down the central aisle and strode onto stage. Will managed to get Marshall to move ahead of a few of the others so that he was standing nearby.

The Star Spangled Banner began to play and they all saluted the American flag on stage. Will had to coach Marshall a bit; he wasn’t sure what to do, and they had forgotten to tell him. Will found himself singing along, though Marshall was silent, since he didn’t know the national anthem of the United States.

Urlacher went to the microphone. “Good morning everyone. We are gathered here to welcome a returning hero back to the United States. Dr. Will Elliott has devoted half of his life to space exploration. He first earned his astronaut’s wings when he was 28 years old, unusually young, and immediately distinguished himself in the field of lunar

geology, so much so that everyone called him ‘the moon man.’ After twenty-one years on Mars, this title has been all but forgotten, but it was that record of scientific acumen and capability that earned him a place on Columbus 1, which landed on Mars on February 28, 2036. Originally planning to remain only one tour of duty, Dr. Elliott became so intrigued with Mars that he stayed a second columbiad, marrying his fellow crew mate, Ethel MacGregor, and at the end of the second tour of duty their first child, Marshall Elliott, was born on the red planet. Marshall, please raise your hand.”

Marshall nodded and raised his hand.

“Dr. Elliott soon became a major force behind Mars’s expansion, working tirelessly to develop locally manufactured structures, to expand the supply of local resources, to push forward the export of Martian fossils, gold, and platinum-group metals to Earth, to enlarge each Columbus to carry more people than the previous one, and to settle the Red Planet. After two decades, the population of Mars now tops the thousand mark, with continued growth projected.

“The gratitude of history to Dr. Elliott can not be adequately told. He will be remembered as ‘the Father of Mars.’ We honor him today and welcome him home.”

Urlacher began to applaud; everyone followed her lead. She motioned Will to the microphone and he walked to her. They shook hands again. He nodded to the crowd, which leaped to its feet and applauded wildly.

“Thank you. Thank you everyone.” He paused to let the applause die down.

“Thank you again. When the six members of Columbus 1 left Earth in February of 2035, almost exactly twenty-four years ago, for a joint training mission on the moon, I could not have imagined that I was leaving Earth for such a long time. We were scheduled to

return to Earth in May, then blast off one last time in July, and after our eighteen-month mission on Mars we were to have an airbag-landing in a capsule here at Kennedy in January 2038. Three of my crewmates, Laura Stillwell, Sergei Landsberg, and David Alaoui, did indeed return to Earth at that date. But three of us, drawn to this fascinating new world we had reached, emboldened by the reliability of our equipment, and comforted in the knowledge that Mars was the second safest place in the solar system, elected to remain and develop the outpost further. The rest of the story is known to you all; Columbus 2 brought eight people and departed with two; Columbus 3 arrived with fourteen and departed with seven; Columbus 4 arrived with eighteen and departed with three. Columbiad by columbiad our population and infrastructure grew and our capacity for exploration and comfortable living steadily expanded. Today Mars has six permanently settled outposts and four temporary bases, with one of the latter soon moving to the status of a borough; it has over 200 children; it exports five billion redbacks or one hundred billion dollars of valuables every columbiad; it is the headquarters of a mission to explore the asteroid belt; it sends raw materials to Venus, Mercury, and the moon; it even receives tourists.

“I could never have imagined that all this would be possible in the relative blink of an eye. In two decades, Mars has become a new home for the human species, its culture a new form of human expression. Mars is not perfect, but it has achieved a level of peaceful international cooperation, of justice, of stability without terrorism, and of universal prosperity that the nations of the Earth sigh for in vain.

“Under such circumstances, our thoughts inevitably turn toward the future. I am here, in addition to touring the Mars Commission’s facilities all around the world, to

encourage everyone to support the settlement of Mars. The next decade and a half will see major changes on the Red Planet. Our population will grow by about 7,000, one two millionth the population of Earth. Hence we are challenging every nation to budget the resources to ensure their representation on the new world. We challenge the richest and boldest nation on Earth to send 1,600 of their citizens to Mars. In this way America will guarantee the voice of its culture and language in the creation of a new branch of human civilization, the branch that may very well lead us to the stars, a branch destined to grow into a mighty nation, just as Jamestown and Plymouth launched the United States on the path to international greatness four and a half centuries ago.

“We are not asking for a great sacrifice: thirty billion dollars per year out of your 1.2 quadrillion dollar economy. The cost of the original Columbus missions that landed six of us on Mars, converted into current dollars, cost sixty billion per year. But Project New World will bring a hundred times more benefits because it will create a new nation on a new planet, a nation that will create technological innovation, partner with governments and corporations, and dare to dream about the expansion of our species into space. Mars has already been the home port of vehicles that have carried human beings to five worlds. Its residents have visited a dozen more worldlets and have been centrally important on the moon, in Venus orbit, and on Mercury. Its role in humanity’s future is great. Project New World will move Mars to the next level in its development. Your participation in it will bring great benefits to the United States and will be crucial to all of humanity. Thank you.”

Will stepped down from the podium to vigorous applause. It was his stump speech, parts of which he had used in the thirty television interviews he had taped over

the last week. But everyone clearly enjoyed it and the staff at Kennedy was inspired by it, for they aspired to go to the stars.

Urlacher returned to the podium to thank Will, then introduced Pierre Messier, Vice Commissioner of the Mars Commission. As he was walking to the podium, she turned to Will and whispered. “Excellent speech. Of course, there’s no way the U.S. will permit half of what you propose.”

Will looked at her, startled, and wondered whether she was joking or beginning the first round of negotiations.

Stamford

Jan 10-15, 2059

It was a long day at Kennedy. The welcoming ceremony was followed by a tour of the Swift shuttle facility followed by a lunch reception, meetings with various officials, a late afternoon press conference, a formal dinner, and more meetings. The gravity and the crowds had exhausted Marshall and they had to wake him up to board the chartered jet.

“I think you’ll find this quite comfortable,” said Louisa, leading Will and Marshall on board. “It can sleep a party of eight—eight private rooms, each with a work area—has a galley for meals, and can accommodate twenty-five additional passengers with sleeping cubicles and a common area.”

“The press?” asked Will.

“Exactly,” said Louisa. “The eight will include the three of us, my two media assistants, your administrative assistant, an all-purpose assistant—he’ll cook and make sure clothes are pressed—and a room for the flight crew.”

Will nodded. They stepped into the front area of the aircraft—there was also a rear entrance for the press—passed the forward lounge and galley, and walked down a narrow central corridor with doors leading to small rooms on each side. He opened the door that had his name on it. It was bigger than average, two meters deep and three meters wide, with a bed that was already folded down from the side wall and ready for use. He could squeeze past the bed to a large desk in front of the windows. When the bed was folded up, its space became a private meeting area.

“This will be very comfortable. How much did this plane cost to lease?”

“Several million bucks, including the crew,” replied Louisa. “But the seven of us won’t need any hotel accommodations on the world trip. When we’re on the ground we can take showers and use all the water we want; when airborne the water supply is more limited. We’ll have great food, too.”

“Excellent. I should plan to visit the media almost every day?”

“Yes. They’ll be roughing it; most will be sleeping in the back and using our bathrooms. They have very small sleeping cubicles and a common work space, so they’ll manage alright.”

“What did you make of that question about whether vacuum cleaners work on Mars?” asked Will.

“That was strange,” agreed Marshall, who had heard the press conference.

“Your instincts were good,” said Louisa. “Stick to the science; they don’t generate a strong vacuum and the air pressure at the outpost is high enough so they work normally. That reporter is from a very conservative cable station that’s extremely cool about Mars exploration. I think he was hoping you’d say ‘I don’t know, I don’t use vacuum cleaners, so I can’t compare.’ That would have created a news headline about how the Mars crew are not ordinary middle class people at all, but they live in luxury and have robots do everything for them. You see the trap? But you avoided it.”

“There was something in his tone of voice that worried me.”

“I’ll check the media coverage later tonight, while you sleep, and I’ll give you a summary in the morning before you go to your mother’s. I suspect there were several angles to a story of that sort. There are powerful forces out there that want this tour to fail; forces that believe in America first and see Mars as a distraction or as an ungrateful

child that has turned its back on America and embraced internationalism; forces that see Mars as a waste of money and a diversion of funds from human welfare and environmentalism. The media reps on the plane will at least be moderate; I've refused few requests for space from extremists. But at every local stop there will be people we don't know who have agendas of their own."

"That's what I thought." Will frowned. "Vice President Urlacher surprised me. She interrupted me several times and always took a combative counterposition."

"She's a smash-mouth, but she's very powerful. They won the White House because she managed to get the young voters—under age 25—to turn out in relatively large numbers, that is, 35%, and vote for them three to one. Before her nomination for Vice President she was the host of the 'Washington Rant,' a loud-mouthed, confrontational talk show about politics that was on one of the music video channels. And she was called the 'queen of liberal talk radio' for her popular daily radio program. Her blog gets millions of hits per day. She became expert at interrupting others and taking confrontational positions. I gather she doesn't do that with the President."

"And she's in charge of space exploration." Will shook his head. "I get the impression politics has degenerated a lot in twenty-two years."

"I suppose." Louisa shrugged; she was uncomfortable by Will's tone. "Politics is just a big game, Will. You'll get used to it. You'll have to, we've scheduled you to appear on a few talk shows where the host interrupts the guest at least twice a minute."

"I can't avoid them?"

Louisa laughed. "Definitely not! The media is balkanized; you can't reach the public by hitting a few outlets. Most people tune into a specific short list of radio and

television stations and websites. If you want to reach everyone you have to deal with the screamers and ranters.”

“Okay, I’ll have to learn how to deal with that.” He paused. “Louisa, I’ll explain what I mean by ‘degenerate.’ Voter turnout is down to 35 to 40% for Presidential elections and consists basically of the political bases of the two parties. Everyone in the middle has been alienated either into hating one side or the other and therefore becoming part of a political base, or distrusting both and not voting at all, or they live in ‘safe’ gerrimandered districts where the winner is completely predictable before election day. Competition for power and therefore for the money you need to win elections has distorted everything.”

Louisa stared at Will, uncertain what to say. “We’ll have to sit you down and talk extensively about how we negotiate in Washington before you actually go there. It’ll require a cultural shift.”

“I can see my vacation in Stamford will be occupied with a lot of matters other than family.” Will yawned. “I’d better turn in; the gravity’s wearing me out. “So, we’ll fly straight to White Plains?”

“Yes. Rest well. The pilot will have to wake you up for the takeoff and landing, but then you can go back to sleep until you’re ready to get up, have breakfast, and head for Stamford. We might as well wait until after the morning rush hour.”

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When Will woke up the next morning, their jet was parked in a hanger in White Plains and hooked up to a water and power supply. He had an ample shower and a nice

breakfast, over which Louisa briefed him about the media reaction to his first day on Earth. It had gone well.

About 8:30 a.m., Will's sister, Molly, and her husband, Taraz Nuri, arrived at the hanger in their car. He welcomed them on board. He was surprised to see his sister's gray hair and wrinkled face—she was 57, two years older than he.

"You know, videophones are just not the same as the real thing," he said, after he had hugged her. "Somehow you look. . . different."

"Videophones are forgiving," she replied. "Will, I can't believe we're together again!"

"It's so good to see you."

Molly hugged Marshall. "It's so good to meet my nephew, too. Have you had a good time with Paul?"

"Oh, yes!" replied Marshall. Paul Nuri, Molly's son, had arrived on Mars several years earlier. "He's really helped me out a lot."

"I'm glad to hear it. You all have been another family to him."

"And now you get to be another family for Marshall," said Will.

"We're delighted," replied Taraz, with a warm, genuine smile that often characterized his face. "We should get on the road relatively soon. There's a blizzard coming and it may shut everything down. They're predicting 15 inches of snow."

"How much is that?" asked Marshall, unfamiliar with the American system of measurement.

"Thirty. . . eight centimeters," replied Will, translating.

"Thirty eight! In one storm?"

“It’s unusual. They say global warming has made the ‘noreasters’ we get in New England worse,” replied Taraz.

“We’re done here,” replied Will. “It’ll take five minutes to get our luggage.” He led Molly into his room, talking to her continuously, while he packed. Taraz went to help Marshall. They stepped off the plane and walked across the hanger floor to the car, which had melting snow on its outside. They placed the luggage in the trunk and got in. Then Taraz drove them out of the hanger.

Marshall and Will had actually not been outside yet; the day before they had walked between buildings at Kennedy, but had boarded their jet via a jetbridge and had flown north after dark. They were both startled to move out into a grayish-white fog of fine snow. Visibility was already reduced to just a few miles.

“It’s like a dust storm!” said Marshall.

“It is,” agreed Will. He pointed. “But dust storms on Mars don’t blanket trees with stuff.”

“They look dead. Oh, but that’s because they don’t have leaves this time of year,” said Marshall, remembering.

“Yes, these are deciduous trees; they drop their leaves in October,” said Taraz.

“We have them on Mars, too, and they drop their leaves before winter there as well. I just forgot that it’s winter here.” Marshall sat and stared.

“To mom’s place, please,” Taraz said to the car, and he pushed a button to activate the autopilot.

“Acknowledged,” it replied.

“Maybe I can drive a car on Earth after all,” said Will, looking at the steering wheel as it turned itself. “Of course, my driver’s license has been expired for twenty years.”

“You still need that, and insurance,” replied Taraz. “Sometimes you have to take over from the car. With a light snowfall, statistically the car does a better job of driving itself because it can measure traction very precisely. But it drives very slowly!”

“Besides, if it makes one of its rare mistakes, we can sue,” replied Molly. “No, I’m joking. People do sue a lot, though; almost every accident that occurs now results in a suit against a software company. They’ve been seeking protection from Congress.”

“I don’t blame them,” replied Will. “So, what can you tell me about mom?”

“She’s doing pretty well, for 88,” replied Molly. “Her mind’s sharp as a tack but her body gets weaker. There’s been a noticeable deterioration over the last year.”

“I’ve had a noticeable deterioration over the last day,” replied Will. “When I woke up this morning, both knees hurt. But seriously, I gather she’s doing pretty well.”

“Definitely,” replied Taraz. “So, Marshall, are you enjoying Earth, so far?”

“I haven’t seen much more than a bunch of buildings at Kennedy! I think I want to go outside some time and experience the . . . weather.”

“That’ll give you quite an experience fast,” replied Taraz.

“Are you looking forward to MIT?” added Molly.

“Oh, definitely! But a lot of mom and dad’s astronaut friends say to me ‘you’ll like it, the long interior corridors are just like Shackleton’ but they seem to forget I’ve never been to the moon!”

“The Outpost is a lot more outward-facing than Shackleton,” added Will. “I wish we had time to visit the moon, but it’s not possible.”

“We’re grateful you arranged five days to visit us,” replied Taraz. “We don’t expect to see Paul again for decades.”

“It may be a while,” agreed Will. “You should definitely be proud of him, Taraz. He’s a fine young man.”

“We’re immensely proud,” agreed Taraz. “It’s too bad round trip transportation is still so slow and expensive. We’d like to see grandchildren some time.”

“That may not be too long, with his fiancée arriving on Mars in a few weeks,” replied Will.

“We like her very much,” replied Molly. “What are your impressions of Earth?”

“Still limited. I am not impressed by the depths to which politics have sunk.”

“The partisanship is terrible,” agreed Molly. “It’s gotten so bad, many universities are mostly Democrat or Republican and it’s hard to attend if you are of the wrong party, or of no party at all.”

“I get the impression that good people have been driven from politics by the intense attacks and general nastiness.”

“Yes, that’s true,” said Molly. “There are no statesmen any more. People lead with focus groups and sound bites. But it isn’t just attacks and nastiness; there’s also a focus on completely irrelevant things. In the last Presidential campaign one candidate was very successful at making the other candidate’s suits and ties a campaign issue.”

“And elections don’t end with the voting,” added Taraz. “There are the lawsuits and recounts, which are made very complicated by all the demonstrations and even riots by the faithful.”

“It’s very dangerous for the country, though,” said Will. “The fabric of democracy is being weakened and government can’t function properly.”

“That’s very true,” Taraz said, sadly. “It’s the natural consequence of a system of governance based on competition. The checks and balances were supposed to control corruption, but they have now become instruments of corruption instead.”

“Good luck keeping the mess off of Mars,” added Molly.

“So far, so good,” replied Will. “If I ever retire from my job, I intend to become a voice of conscience about good government based on principle and consultation.”

There was a moment of silence as the car got onto a freeway. Marshall looked at the snow-covered cars and trucks whizzing by. “So, dad, they don’t have anything like rangers here at all.”

“No. The nearest equivalents are jeeps, humvees, and land rovers. On Mars all our vehicles are tall enough to stand in because you have to be able to put suits on and take them off; and they all tend to be the same width as height because they have to be pressurized. So our vehicles are wider and taller than terrestrial ones.”

Marshall nodded. “Looking at cars and trucks on television for nineteen years, I never figured that out.”

They continued to chat about various topics. A half hour later the car got off the highway and headed for a nursing home on a small side street. Marshall had no coat and had his chance to experience winter weather, complete with stinging snow and ice

blowing on his face. He ran inside and almost slipped and fell on the sidewalk. “Whoa, don’t forget about the ice!” warned Taraz.

“I guess I have to learn some pretty basic things!” replied Marshall, surprised he had almost fallen.

Will walked slowly and carefully, enduring the wintry missiles because he knew his traction was uncertain; it would take a month or more to relearn how to walk in terrestrial gravity with ice under foot, and by then he’d be leaving. Once inside they all felt better, even though it was chilly because of the high cost of heat. It took a few minutes to greet the staff at the entrance; they wanted to shake the hands with Will. Then Molly led them down the hall and to Katherine Elliott’s room.

She was sitting in a chair, dressed elegantly, waiting, and when they entered she stood and walked slowly toward the door. Will spoke to his mother via videomail three or four times a week, so he knew her face was wrinkled and her hair totally white. But he was surprised to see vigor in her step, even though she had a walker and a cane nearby.

“Will,” she said.

“Hi mom.” His voice choked up. He walked over to her and embraced her. She felt small, thin, frail under his arms, her hair felt stiffer, and her smell was different. He looked at her. “You smell different!”

She was startled and thought about that, then smiled. “Will, I don’t even remember the name of that perfume, but I haven’t worn it for thirty years! It was your father’s favorite. You’ve forgotten that I stopped wearing it when he passed.”

“I guess so. The memories of childhood are still strong.”

“Silly boy. Let me hug my grandson.” Katherine turned to Marshall, walking over to him and hugging him. “My, I can see your grandfather in your face!”

“Dad says that, too.”

“He’s right. I’ve watched you grow up by video; now I get to hug you.” She hugged him again.

“It’s really good to see you too, grandma.”

“So, you’re off to MIT!”

“In a few months; I’ll be too late for this semester and everyone says I need time to adjust to Earth.”

“The gravity. I’m still adjusting to it,” she quipped.

“The culture, too,” replied Will. “Yesterday he went into the men’s room and was baffled by the toilets. They had a plastic covering over the seat, the kind that changes after every use.”

“I’ve never seen that before. I didn’t have to do anything, but I didn’t know that, so someone had to explain it to me!” said Marshall.

They all laughed, including Marshall. “Yes, you have some adjustments to make,” agreed Katherine. She turned to Will. “How’s Ethel?”

“Fine. We talked late last night, which was dawn there. We should call her soon.”

“When we get home,” suggested Molly.

“I’m sorry she couldn’t come,” said Katherine.

“Next time,” replied Will.

“And how’s the work on the House of Worship? I haven’t heard anything for months.”

“It’s moving along slowly, according to the plan approved by the Universal House of Justice. The ‘Bahá’í Garden’ is now an accepted part of Aurorae Outpost and is much appreciated. We have a lot of strollers and people seeking peace in there. The flowers and shrubs are all established and it looks quite beautiful. Six months ago we excavated the foundation for the actual House of Worship in the middle of the dome and poured the concrete basement. We’re now setting up the basement as a small, central worship area and side rooms for adult and children’s classes. The plan is to start the superstructure in another four to six years. Right now the Bahá’í community on Mars is fairly small and can’t use or support a large building.”

“I suppose the delay is wise, then,” said Katherine. “Well, let’s head out into the storm before it gets any worse.”

They all put on their coats and helped Katherine bundle up. Then they pushed her in a wheelchair to the car and they all climbed in.

The house was a five-minute drive away. Several vehicles with media people were parked at the bottom of the driveway and got out to take pictures of them arriving; they all waved reluctantly, then drove into the garage and closed the door. Then Katherine retired to the living room, Molly to the kitchen, and Taraz took Will and Marshall to their bedrooms where they’d be staying for the next few nights.

They all ended up in the kitchen, talking and helping to prepare lunch. The meal was large and grand, and Katherine ate a lot; she still had an appetite. Then they retired to the living room to drink tea.

“So,” Katherine said. “Are you happy?” She looked at Will smiling.

“What a question, mom.” He considered. “Yes, of course, I’m happy. I have a marvelous wife, two great children, and a very exciting and challenging job. Of course, the job is usually too challenging, but that’s alright.”

“You have an amazing job,” she agreed. “But sometimes I think it becomes a distraction from the real purpose of life.”

“Sometimes it does. I suppose my main concern is that Mars develops a society without all the defects of Earth’s society. So far, we’ve done fairly well.”

“It helps to have the Bahá’í principles,” replied Katherine. “I see them behind much of what you do. You’ve even managed to hold elections on Mars for sixteen or seventeen years without political parties or electioneering.”

“Well, there is a little electioneering, but we’ve managed to minimize it so far. If there’s anything I want to do, it’s to create a culture where we don’t need a competitive system for choosing our leaders. The damage it does to American society is profound. There are now attack ads against politicians on television all four years of the presidential election cycle. People are constantly told to fear the other guy and his party.”

“They’re now spending twenty billion dollars on presidential campaigns,” agreed Taraz. “If you can prevent that from happening to Mars, it’ll be an accomplishment.”

“We can’t afford that kind of society,” replied Will. “We’re too diverse; ethnic groups would be pitted against each other or would feel completely disenfranchised.”

“But can you really keep competition out without the spiritual values to prevent corruption?” asked Katherine.

Will shrugged. “I don’t know. Whenever I retire—six or seven years, I suppose—I’ll devote the rest of my life to bringing people together. That’s why we spent so much

money on our house; we wanted a place suitable for entertaining. We've already had the entire Mars Council over twice and we plan to have the Aurorae Borough Council over as well. I'll devote most of my time to keeping our political system healthy."

"If people will listen to you," said Katherine.

"They will, right now," replied Will. "I don't know how long that will continue, but many ex-Presidents have managed to use their prestige to accomplish a lot, and thereby maintain their prestige as well."

"I guess that's the best answer to the question 'are you happy' I'm getting for now," said Katherine. She reached over to her cane. "I need to take a nap, I'm afraid. What's the plan?"

"Hang around the house today," replied Will. "Visit, catch up, watch it snow. Tomorrow morning I bet the town will be dead; everyone will be digging out from the storm. It might be a good time to take Marshall to the mall."

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They talked the rest of the afternoon, then all drove to Katherine's nursing home to watch two taped interviews of Will on television. After that, Katherine was exhausted and they left so she could rest.

She wasn't interested in seeing the mall, so they made that their morning activity. They drove to her nursing home because the parking lot had entrances on two different streets; as hoped, they fooled the media by driving in one entrance and out the other, then heading to the fanciest mall in the area, which was not the nearest. They arrived when it was only open for "walkers," people who needed to exercise, right before it opened for

business. As soon as the stores opened, they window shopped through department stores and boutiques as well, but concentrated on buying Marshall a winter wardrobe.

Marshall was overwhelmed by the opulence and wealth of the place. Will was impressed as well; he had partly forgotten what malls were like, and in twenty-two years they had grown richer. Molly and Taraz got a good smile from their reactions.

“Wait until you see New York City,” said Taraz.

“I guess we’ve done pretty well for having a fourteen millionth the population of Earth,” said Marshall. “If we want a sofa, we can choose among three or four designs and each can come in a dozen covers. I know two or three people with sofas that look like ours. I had no idea one could flip through thousands of web pages of sofa designs, each of which could be ordered in a few sols; I mean days.”

“You never see someone with the same sofa as you,” said Molly.

“That diversity of choice is coming our way, though,” said Will. “Every columbiad we import more equipment and acquire new capabilities. We already can choose among tens of thousands of clothing designs. The choices of fabric are limited to about six or eight, but there are hundreds of choices for the cut of the fabric and the colors and patterns are nearly infinite in number. I think this columbiad that diversity will extend to carpets, draperies, sheets, towels, upholstery for furniture, etc. And we can already get all sorts of custom designs because of the growing range of private manufacturers.”

They came out of a department store and back into the central space of the mall loaded with packages. Will pointed to a small store that sold rich, sticky-sweet, sugar covered cinnamon buns. “Now that’s something I haven’t had in two decades,” he said.

“If we have that, we can’t buy you M&Ms,” said Molly, sounding parental.

“I haven’t had them for two decades either, but they can wait. Oh, I want to go to a steak house. We have beef on Mars, but not in the kind of quantities that allows for sixteen-ounce prime cut steaks. That’s something I want.”

“Tomorrow evening,” suggested Taraz.

They walked to the bun store and sat to eat cinnamon buns. The place immediately filled up with a crowd of curiosity seekers; about ten percent of the people in the mall recognized Will, but most weren’t sure it was really he.

“I was fascinated by your comment last night that Mars really can get to 7,000 people in fifteen years,” said Taraz. “And that you can employ them all.”

“It’s simple math,” replied Will. “Based on current numbers, eighty percent of the immigrants will be of child-bearing age, and within a decade they’ll have an average of 0.8 children each. We’re already importing five hundred people per columbiad, or per twenty-six month interval between the favorable alignment between Earth and Mars. They produce a natural increase of their own of four hundred more in ten years, so right now we’re already growing by 900 per columbiad. Our calculations indicate we can pay for an immigration of 600 per columbiad with our own exports. If this campaign can bring in governmental support, then we can boost the immigration rate even higher.”

“What I don’t understand is how Mars can essentially conduct a space program of its own,” said Molly.

“Improvements in technology have changed the economics of space exploration dramatically in the last two decades,” replied Will. “It costs a sixth as much to put something in low Earth orbit now as it did in 2035 and a twentieth as much to send

something to Mars. The technology needed for people in space—life support systems, artificial gravity, thermal protection systems, cryogenic fuel storage, rocket engines, avionics—are much more reliable and cheaper than they were in 2035. In another two years it will be cheaper to put something in low Earth orbit from the Martian surface than from the Earth’s surface because of solar sailing technology. Sailers require no fuel and almost no maintenance.

“The other side of the equation is financial resources. Our people are twice as productive as workers on Earth, so 1,000 already produce like 2,000 here. So you can see how we can divert some of our export income to purchasing equipment and divert some of that productivity to mission operations and support. The current Mercury and Venus missions are about the size of something Mars could support in another decade.”

“Mars may send a team to Saturn, then,” said Taraz.

Will nodded. “Marshall might be on board, too.” He looked at his son.

“Jupiter and Saturn will cost more because of nuclear power,” added Marshall.

“But Mars may very well be the central supplier of that. We already supply half the uranium the moon and Mercury need. We still can’t build reactors or nuclear engines, but that may be a matter of time.”

“No none dares test such engines on the Earth because of environmental protection costs, and privacy is limited in earth orbit or on the moon. But Deimos has some very private spots,” added Will.

“Doesn’t nuclear power scare you, though?” asked a man at an adjoining table, who had been listening in.

Will turned to the inquirer. He was in his thirties and wore blue jeans and a t-shirt under his leather coat. He had a scruffy beard and slightly long, unkempt hair pushing out from under a New York Yankees cap. Seated with him was a ten year old boy. “Yes, in a way it does. We have to worry about accidents when radioactivity gets released into the environment. But we know the radiation can’t get into our houses, work areas, and green spaces because they have to be pressurized. Radioactive dust blowing around the Martian desert isn’t too much of a threat to us.”

“I suppose it’s just a problem for the cactuses, then.”

Will wondered whether the man was serious. “No, the Martian desert has no cactus. It’s lifeless. The planet has a very thin atmosphere that nothing can breathe, it has no rain, no snowfall except at the north and south poles, and it’s colder than Antarctica.”

The man was startled. “Damn! Why not live in Antarctica, then!”

“Well, Antarctica has six months of daylight and six months of darkness, and even though it is warmer than Mars on average, it feels much colder because of the wind chill. On Mars the sun rises every 24 hours and 39 minutes, so the day is about the same, and inside our space suits and domes we actually have the problem of getting rid of heat.”

“What do you do there?”

“Well, some of us obtain gold and platinum for export, some of us provide support services—doctors and teachers, for example—and some are scientists that explore Mars. For instance, we’ve found lots of rocks on Mars that formed between 4.3 and 3.7 billion years ago, when the solar system was young, and in those rocks we can trace the progress in bodies of water from simple organic compounds to complex compounds to simple life forms and then to more complex life forms. We now know of

six major steps that were necessary for life to arise on Mars. That tells us something about how life arose on Earth.”

The man’s eyes opened wide and he nodded. “Yes, I’ve heard about that. The minister in my church gave a sermon about evolution five or six years ago, and I remember he said that we now see how life evolved on Mars and we don’t see anything like that on Earth, so that proves God created life on Earth directly.”

Will was startled by that claim. “Well, I suppose some people have that interpretation.”

The man nodded. “So you see, I have heard about your work after all!”

“Yes, I guess so,” agreed Will.

“Say, are you a duck hunter?”

“I beg your pardon?”

“A duck hunter. Every fall I go up to Maine with my 32 caliber and shoot ducks. I usually get three or four; they’re really tasty, though you have to make sure you get all the bullet fragments from the meat!”

“No, we don’t have duck hunting on Mars. We don’t have any wild spaces, we don’t have wild ducks—not yet—and we don’t have guns.”

“No guns? You mean you have gun control?”

Will suddenly realized he was straying into an emotional topic. “Not exactly. We don’t need guns up there; there is no hunting, no crime, and no need for a militia. Bullets would make holes in our domes and let the air out. So we don’t have guns.”

“But couldn’t you take them outside and do target shooting?”

“Perhaps we could, but people would still worry about stray bullets blowing holes in buildings and domes. Besides, we have a lot of people from Europe and other countries there, and they come from places where there are very few guns. They don’t want guns on Mars.”

“Well, tell them that’s just too bad! Being able to own a gun; that’s a basic right!”

“It’s never come up.”

The man was surprised. “What should I study, to go to Mars?” asked his son.

“Almost anything,” replied Will. “We need construction workers, doctors, scientists, engineers, farmers, repair persons, machine operators. . . you name it. But they all have to know how to work with computers and especially with robots; almost all our work is machine-augmented.”

“Hey, I’ll go,” said the man. “I’m a union carpenter and I’m working on certification as an electrician as well. I’m unemployed right now, so I have time to take a few courses at the technical college.”

“We need all sorts of skills, so you can always apply.” Will looked up. The circle of people around them was growing steadily and now numbered maybe fifty. Molly was looking a bit nervous; Taraz, ever the generous host, was buying a huge platter of cinnamon buns to pass out to everyone. “I can take a few more questions, folks,” said Will. “What would you like to ask?”

3.

Washington

13 Jan. 2059

Three days of relaxing visit to Will's mother and sister in Stamford was followed by a one-day trip to Washington. Will awoke at 4:30 a.m. and immediately pulled a back muscle sitting up in bed. A hot shower helped, but he was limping a bit when he reached the kitchen table.

“What did you do?” asked Molly.

“I sat up too fast and pulled a muscle in my lower back. Those muscles are still weak; I didn't do the prescribed number of sit ups every day on the flight here.”

“And now you'll pay the price. If it's any consolation, I've hurt my back that way; it may be genetics.” Molly put a plate of toast and jam on the table. “I went to wake up Marshall, since he said he wanted to have breakfast with you. He isn't feeling well; a sore throat and runny nose.”

“Oh? When did that start?”

“The nose woke him up a few hours ago.”

“I'm glad he's not going to D.C., then; he'll need to rest today.”

“It'll be a quiet day here, especially if the press leaves us alone. It's supposed to be sunny and forty degrees, so we planned to take him for a drive.”

“He had better rest for the MIT trip.” Will glanced at his watch. “I've got fifteen minutes.”

“The limo's already out there, waiting.”

Taraz entered the kitchen and greeted them. They ate together quickly, then Will tossed on his overcoat for the quick drive to the airport.

The plane landed outside Washington at 7:30. A limo bearing Vice Commissioner Pierre Messier and Director for External Relations Krister Soderblom whisked them to their meeting at NASA headquarters. After a quick tour of the building, they entered the meeting room at 8:30, where they waited without any hospitality for the others to arrive. The lack of even coffee prompted comments by Louisa, Pierre, and Krister in French, which Will followed as closely as he could. It was clear they were confident no one else in the building knew the language.

Finally Vice President Ruth Urlacher, NASA Administrator Darius Rosen, Admiral Jered Dewey of the Nuclear Power Administration, Brian Stark of the New Hanford Reservation, Mars, and their associated aides appeared. The Vice President walked straight to Will, who stood. “Good morning, Mr. Commissioner. It’s good to see you again. Have you had an enjoyable stay?”

“Good morning, Madame Vice President. I have indeed. It’s been incredibly special to see my family again and introduce Marshall to his grandmother and aunt. We’ve all—”

“I saw you visited a mall as well. It created quite a stir,” she said.

“Yes, we wanted peace and quiet and ended up with a crowd asking all sorts of questions.” He decided to keep his sentences short so she wouldn’t be able to interrupt.

“You’ve been on just about every news show as well. That must have cut into family time.”

“They were taped before landing.”

“Oh, I see.” She gestured that everyone should sit at the table, a long, thin piece of furniture with microphones along it. The two sides sat parallel to each other. “Based on your interviews, I think we know what you’re asking for,” continued Urlacher. “So perhaps we should tell you what we are asking for. We have three broad concerns that will have to be addressed—”

“Excuse me, Madame Vice President, but media interviews are not the medium I use for stating the Commission’s goals and objectives to NASA and the United States government,” replied Will, speaking over her instead.

“We don’t have a lot of time, Dr. Elliott, so I suggest—”

“I suggest we split the time in half and use it efficiently,” said Will, completing her sentence. “I’d hate to run out of time here. I’m sure we’ll have plenty for discussion in Beijing, and warm hospitality complete with infinite quantities of tea.” He looked around at the bare room.

“Very well,” replied Urlacher, irritated. “Give us the précis.”

“We’re honored to do so,” replied Will. “The United States has been the principal pillar of Mars exploration and settlement, and we prefer to see that continue. Of the 1,000 people on Mars, one fifth are Americans. A third of our imports come from the United States; our single largest source. Our working language is English; everyone knows that language; that will continue on Mars probably for centuries.

“But the position of the United States in Mars exploration has not been constant. The earliest missions were one third American by staffing and about fifty percent financed by the U.S. There has been steady erosion since. Two dozen of America’s most

capable astronauts have had their tours of duty on Mars, so we have been an important training ground for talent.

“It is essential for America’s future that she continue to play the preponderant role in the settlement of the Red Planet. The speeches I’ve given called on the U.S. to send twenty percent of Mars’s future settlers, and that’s on top of the Americans we already are importing via our export income. That doesn’t include current U.S. government funding of Mars-related research occurring in the U.S., which doesn’t support anyone’s immigration to Mars. It is not difficult for the U.S. to do this. If the U.S. sent 1,500 settlers over 15 years, it would cost a fifty thousandth of the country’s economic output. The money would come back here in terms of purchases from companies and research done in cooperation with U.S. universities, not to mention the excitement it would spread about science and engineering.

“What will these Americans on Mars do? Mars is increasingly in the position to move into high technology development and application. Our ability to make inflatable space vehicles based on surface domes and other structures produced the caravel, which is becoming a standard vehicle design; we’re now selling them to Venus orbit and even Earth orbit for stations. We’re considering a Caravel 2 that will have four times the interior volume and twice the diameter and could move 400 settlers to Mars at a time. Nuclear technology is the obvious choice to carry out in partnership with the United States, specifically three types: gas core nuclear engines, plutonium production, and two-to five-megawatt reactors.

“Plutonium production on Mars is much safer and politically more palatable than lifting plutonium from Earth, and the Martian population will go along with it if

guarantees are in place that the plutonium is for purely peaceful purposes. Mars needs a new generation of inexpensive ten to thirty-megawatt reactors to guarantee its power needs during global dust storms, and such reactors are needed on the moon and Mercury as well; they are also the right size for an outpost on Callisto. We don't need gas-core engines for settling Mars until their prices come down substantially, but we can provide a testing venue for them, and Martian plutonium can fuel them.

“There are numerous other areas of collaboration that we could discuss, such as asteroid exploration, Project Odyssey, bioarchive, and additional commercial development of Mars. But I'll elaborate on them as needed.”

Urlacher nodded. “Right; thank you. Darius, can you summarize our offer?”

“Sure. It's pretty simple and overlaps Dr. Elliott's agenda closely. Developing gas-core nuclear engines is our highest priority. For that purpose we want a long-term lease of all of Deimos, so we have the privacy to develop the technology. We'll build a temporary facility there. The researchers will be permanently stationed at Aurorae Outpost and will have their labs at New Hanford.

“New Hanford will indeed move into plutonium production. We are willing to develop ten to thirty electrical megawatt reactors in partnership with the Mars Commission—we'd prefer larger reactors in the fifty-megawatt range—but only on the condition that you do not enter into any contracts with China to sell them caravels, fuel, or anything else. It is not in America's interest to see China send men to Jupiter or any other place and increasingly it is our policy to oppose their expansion into space.

“As for immigration, we find your fifteen million redback figure high, considering your own Park report sets the cost at eleven million, the costs have been

steadily falling throughout the last two decades, and considering we are being asked to send a lot of people. If we offered a billion redbacks a year for fifteen years, we'd want 1,500 additional Americans on Mars, not 1,000. We have no objection if you charge the Chinese fifteen million, however.

“We are also interested in continuing bioarchive, especially since the costs on Mars are now declining substantially and the project has proved valuable to ecologists studying American ecosystems. Most of the money stays here anyway. We encourage Mars to develop commercial investment far more extensively; that's where you will get not only the money to fly immigrants there, but jobs for them to do. I think you would agree that flying people to Mars for the sake of moving them there doesn't make sense, especially considering how much more dangerous and difficult life is there.

“I think that summarizes the situation. We're stretched; the moon absorbs ten percent of our space budget, our cooperation with the Europeans over Venus and Mercury another ten percent, near earth asteroid exploration another five percent, Earth orbital work twenty percent, Project Odysseus is eating up forty percent, Mars already receives ten percent, and various scientific and engineering research programs consume the rest, some of which directly benefit Mars. New Hanford is not funded through NASA and represents another substantial commitment. So if you want twice as much money from us, you need to give us substantially more.” Rosen leaned back in his chair.

Will glanced at the others on his team. “You know, one of the interesting things about Mars is that it is neither east nor west of anything,” he began. “It isn't part of the eastern hemisphere or the western hemisphere—”

“Perhaps so, Dr. Elliott, but you are from a specific hemisphere. You are an American,” interrupted Urhlacher.

“Ms. Vice President, I am here today not as an American, but as Mars Commissioner. As I was saying: Mars has 125 million square kilometers of land; that’s 50 million square miles, or 16 times the size of the United States. All of that land has water underneath it. After twenty-two years of research and development of life support systems, we can now make airtight transparent cylinders twenty meters long and ten meters wide on Mars for a mere quarter of an annual Marsian salary. That’s enough to feed and recycle the wastes of two people. Simple life support and waste recycling equipment to assist the biological processes in that 200 square meter space doubles that figure. Ten tonnes of water and a tonne of air in the cylinder is negligible in cost. We can make much larger domes where the cost per person is less. The sun does most of the work; even though Mars is cold, we have to remove heat from the domes. Solar cells and fuel cells to maintain the electrical supply of that 200 square meter dome cost another quarter.

“This underscores an important fact: it is more expensive to fly people to Mars and fly terrestrial necessities to them than maintaining them after arrival. Over someone’s lifetime, the flight amounts to half the cost. The Park Report only considered their cost to stay fifteen years. Admittedly, the cost of maintaining a twenty-five year old on Mars in 2059 is probably more than maintaining him or her forty years later, when he or she is 65 and ready to retire; but we really don’t know how much it will be then, do we? Better to be conservative and careful than to find oneself short of funds later.

“The figures underscore another important fact: once people are there, it isn’t so difficult for them to generate enough economic return to justify their presence. Skills help, but they aren’t obligatory. We have twenty-four Nigerian Christians on Mars; they had never been to the moon, had no science training, but they knew carpentry, plumbing, and how to operate heavy equipment, and they could build almost anything. As a result, they are now doing very well financially. That would be equally true of three thousand Chinese immigrants.

“And since Mars is neither of the east nor of the west, 3,000 Chinese, or Saudis, or Ethiopians are all equally welcome to come. We do not and will not discriminate, either in favor or against any group. The American colonies were in the same situation in the seventeenth century; they accepted all sorts of criminals and religious deviants because they needed to fill the land. We need to fill our land as well.

“We don’t need nuclear reactors in order to fill our land. They help; they guarantee a certain level of power production during dust storms. But wind turbines and extra square meters of solar cells do the same at a lower cost. What we need are very cheap and reliable nuclear reactors. Perhaps that’s a contradiction in terms, in which case we’ll continue to store six tonnes of oxygen and methane per person to ride out the storm season. We are not adverse to partnering with the Chinese or someone else to develop a cheap nuke if they are interested. So we see no reason to agree to your terms for developing big reactors. In fact, based on the checkered history of Project Odysseus and of Project Columbus before it, we suspect the reactors you develop will be too expensive for our use anyway.

“As for Deimos, it’s not for sale or lease in toto. We have a fuel making facility there and will keep it. It’s a bit south of the moon’s equator. If you want the moon’s northern hemisphere, we’ll lease it to you. We’ll even adjust the boundaries if you want your main facility next to ours, so it can use our spaceport. We might even be persuaded that since the United States is a valuable ally with a long history of responsible stewardship over nuclear power, we should lease the northern hemisphere cheaply. Alternately, a generous annual payment could be part of a bigger package that included reactor research, cheaper immigration, and other concessions.

“So, what do you think of that?”

Urlacher glanced at her watch. “I can see we won’t resolve this matter before we go to the Smithsonian at 11:30.”

“Then perhaps the Mars Commission should order some coffee, tea, and doughnuts for all of us, so we can all sit back and be comfortable,” suggested Will.

“No, we’ll order them right now,” replied Rosen, and he stood up to confer with an aide. He sat. “Colonel Stark, can you summarize our needs on Deimos?”

“Yes, gladly,” replied Stark. He looked at Will with an expression that conveyed the need to warm things up and bring about some compromise. He offered a brief but clear summary of the problem of overflight over Deimos and the need to schedule shuttle flights to Embarcadero so that they would never pass over the facility. Then he defined the minimum amount of territory they needed for security as only a third of the moon, to the startled discomfort of the others on his side. Immediately sensing the situation, Will reassuringly offered to lease half the moon, much to their relief. Vice President Urlacher personally poured tea for Will after that.

The issue of reactors proved thorny, however; they wanted larger reactors, not smaller ones, and even the largest ones made electricity for ten times the cost of solar and wind energy. Will wanted a few even smaller reactors for the polar bases, but they were simply too expensive. He reluctantly committed to 140 million redbacks from the Mars Commission per year for ten years to get two twenty-megawatt reactors if the northern hemisphere of Deimos was leased for sixty million per year; at that rate, they got one 20-megawatt reactor for free. The U.S. made no commitment to maintain their existing financial support for Mars, either.

They still had many details to resolve when the time came to ride in two limos to the Smithsonian for a ninety-minute ceremony. After a series of speeches, they all walked through the *Olympus*, the original shuttle to land on Mars, toured one of the first rangers and portahabs, and strolled through a copy of the first inflatable hab they lived in.

Then on to the White House, where over a late lunch they finished the negotiations over the reactors. The immigration issue was resolved also; the Commission would guarantee a minimum of 1,000 new Americans on Mars over the next seven columbiads or fifteen years, while the United States would add 700 million redbacks per year to its Mars commitment. It was a reasonable compromise; the U.S. would officially pay for 750 more, and the Mars Commission would pay for some out of its mining profits. The Americans dropped the issue of Marsian cooperation with the Chinese.

The President came out and shook everyone's hands, congratulated them on the successful discussions, and led them to the Rose Garden for a quick press conference in the chilly air. Will came back in for a twenty-minute private meeting with him at the

President's own request; he was actually interested in visiting Mars some time after his official duties were over. Then it was back to the airport for the flight home.

"I think we did reasonably well," said Will. "We got a reasonable immigration quota, at least. That will put pressure on others to make similar offers."

"Imagine if we get a thousand Chinese, a thousand Europeans and Russians, a thousand Indians, fifty Canadians, fifty Australians, a hundred Pakistanis, a hundred Iranians, a hundred Turks, a hundred Japanese, a hundred Indonesians. . ." said Krister. "That would be incredible."

"It would free up our funds to cover the costs of people from less wealthy nations," agreed Will.

"Except you agreed to cover the costs of two hundred fifty Americans," noted Louisa.

"We'll have enough to do that; besides, the U.S. is the country with the largest number of well qualified candidates, and they include lots of engineering students who are now U.S. residents but are originally from, say, Sierra Leone. So we'll be able to get diversity and hire extra Americans."

"The reactors will be viewed as white elephants by a lot of Marsians," noted Pierre.

"The price isn't too bad," replied Will. "We'll have to make sure we need the power, but that shouldn't be difficult."

"How will Deimos go over on Mars?" asked Pierre.

"We have some selling to do," replied Will.

## Houston

14-17 Jan. 2059

For the next two days, Will stayed at home with his family all morning and traveled in the afternoon. He took a limousine to New York City to give a public talk at Columbia University and attend the opening of an exhibit of Martian art at a private gallery. Displayed were landscapes by Ernesto Aves, abstracts by Tatiana Ivanov, and natural rock sculptures by Madhu Gupta-Anderson. All three spoke by video and took questions; Will introduced the program and served as the master of ceremonies. After a dinner with New York businessmen, scientists, and public officials he took videophone calls all the way home, even though it was after midnight. The Washington deal was already threatening to unravel and required a lot of reinforcement.

The next day, Marshall feeling somewhat better, he and Will went to Boston. Marshall visited his future dormitory at MIT. Will gave an enormous public talk attended by most of the university followed by another large gathering at Harvard. In each case he lingered as long as possible—he didn't leave Harvard until 9 p.m.—talking to students. Then he attended a late night meeting of scientists and engineers that went until almost midnight.

When the limo took them back through Harvard Square, Will stopped the driver.

“Come on, Marshall!”

“What?”

“Wake up, I want to show you around; there's Bartley's Burgers, Regina Pizza, Herrell's Ice Cream, and a few other spots.”

“It’s pretty late.”

“That’s better; fewer people around to bother us, and its pretty warm out for mid January.” Will opened the door and Marshall followed him out for a quick walk.

“Dad, I don’t know how you do it.”

“What, all the talks and things? Well, I’m older and need less sleep than you, and I have experience at it.”

“I guess. I don’t think I could ever do it.”

“Sure you could.” He pointed out Bartley’s. “You know, your mother and I once figured out there’s a good chance we were in Bartley’s at the same time.”

“Really?”

“Yes, because my first wife was a graduate student at Harvard, so I was up here a lot. Too bad I didn’t meet a brunette from the little engineering school down the river.”

“Well, you did later.”

“Yes, thank God.”

They crossed the street and walked through Harvard yard a bit, then came out another gate and back to the square. Will led Marshall down a narrow street and they were surprised to see the ice cream place was still open. “Gee, I’m not even sure I have money; oh I do. Come on, let’s get ice cream.” Will led Marshall inside, startling half the customers. But they left father and son alone to order their ice creams, and then the Elliotts headed back to the limo. “I envy you, being here in Cambridge for four years,” said Will. “College was so much fun.”

“But you were down at Brown.”

“I visited here a lot. So many interesting people, interesting talks and films. . . there’s always something new going on.”

“I’m already missing the Outpost.”

“I miss it, too.”

They stepped back into the limo. Will glanced at his watch; 12:15. He leaned forward to speak to the two drivers through the window. “Can you drive us to Providence, Rhode Island, on our way back to Stamford? It’s a different route, but not too much longer. I’d like to spend half an hour and show my son around Brown.”

“Sure, Dr. Elliott.”

“Great. Thanks.” Will leaned back. “Let’s get some sleep, then I’ll take you on a quick, half hour tour of the campus, and then we’ll sleep all the way back home.”

They both leaned back in their chairs and dozed off while the limo headed east, then south. They spent much more time at Brown than expected—they wandered the campus and the student commercial area for forty-five minutes—and then he told Marshall stories half way back to Stamford. It was after 3 in the morning when they finally got to bed.

They rose before nine to wash, pack, eat breakfast, and visit mom at the nursing home. “I doubt I can get back here again, mom,” said Will. “We have a free day at the end of the tour, but the tour ends at Kourou, French Guiana, and it’d be hard to fly up here for a few hours, then back down for the launch.”

“That’s alright, Will. We’ve had six whole days together! At my age I’m thankful for anything I can get.” She hugged him. “I’m so proud of you. I don’t know whether we’ll ever see each other again. In four years I’ll be 92 years old, if I’m still alive.”

“I don’t know whether I’ll be alive in four years, when I’ll be 59,” he reminded her. He hugged her again, and tears came to his eyes.

She turned to Marshall and gave him a quick hug. “I’ll see you next month; I’m sure of that. You enjoy the round the world trip.”

“Okay, grandma,” he said, and he kissed her on the cheek.

Will hugged his sister and brother in law, then he and Marshall headed outside to the limousine, which was waiting to whisk them to the airport. Two hours later they were in Ottawa, where Will met with Canadian space agency officials for three hours, then spoke at the University of Ottawa to an overflow crowd.

After a flight and a brief limo ride, two hours later he spoke to a public gathering in Dayton, Ohio, and met with various engineers and scientists afterward. His plane left Dayton for Chicago about midnight, where the next morning he took a limousine downtown for a 7 a.m. breakfast with potential investors and a short public appearance at the Adler Planetarium. They left Chicago on time at 10 a.m.

A bit after noon they were approaching Houston when Marshall said, “You should look out the window. You can see the damage from the bomb nine years ago.”

“Really?” Will rose, walked to a window seat, and looked out. They were over the city’s northern suburbs where an American military cargo aircraft, unknowingly transporting a terrorist nuclear device, had vaporized in April 2050. There were still partially burned, abandoned buildings below, though the ground was now green again.

“We’ll see a lot more of the damage, even on the south side of Houston where the Mars Commission headquarters is located,” Will replied.

Just then, Louisa came out of her office. “Will, there’s a bomb threat at the conference site. Apparently it’s pretty credible, so they’re evacuating everyone to check.”

“Really? What a mess. What’s happening right now? Breakout sessions?”

“Yes. The Mars Exploration Society has a big session, the Landowners Assembly has a formal business meeting, and there are a dozen simultaneous sessions. But they’re rescheduling the rest of the morning and hope to have everything straightened out by the afternoon session.”

“Has someone claimed responsibility?”

“The New Mahdi Army, a radical Muslim group. They’ve already pulled off a bombing in Des Moines and tried another bombing in Sacramento, but the bomb was found and defused. They’ve issued several credible bomb threats before in the U.S.”

“They set off a bomb in Calgary too,” said Will. “I’ve heard of them.”

“They’ve bombed Rabat and Cairo as well; they don’t discriminate between western and Middle Eastern parts of the world. Thought you should know.”

“Thanks.”

But the threat didn’t delay the afternoon session much; it had been scheduled to start at 1:30 and started at 2 p.m. instead. Will watched the participants file into the auditorium. Most of the five thousand in attendance were the hard core supporters of settling Mars, for anyone who had a utopian vision of Mars inevitably bought some Martian land. There were starry-eyed idealistic students, who saw Mars as a utopian opportunity; middle aged engineers and technicians who helped build the equipment or design new equipment for Mars exploration, and added land ownership to their professional interests; scientists who did research on Mars and had a piece of land they

could call their own; former residents who had returned to Earth for a variety of reasons; those aspiring to be future residents; and aging hippy-types with long gray hair and radical ideas for a Mars without private property, or without religion, or without taxes, or without government, or without marriage. The latter group was also the base of the anti-nuclear forces and the “Red Mars” folks who opposed terraforming the place, even though terraforming had not even been considered yet.

Contrasted to the diversity of the masses was the hardheaded practicality and efficiency of the business interests gathered in Houston. Jackets and ties were the standard uniform of their representatives; profit margins and economic growth were their constant concerns. They were a minority of those present, but their economic power was palpable and often resented. It made for lively discussions in the halls and restaurants around the auditorium.

When Heather Kimball, President of the Mars Exploration Society, introduced Will, he entered the hall from the back rather than approaching the stage from its rear. The effect was electrifying; everyone rose to applaud and the aisle was crowded by people reaching out to shake his hand. He shook hands, greeted people, exchanged pleasantries, and strode forward as quickly as he reasonably could. It took five minutes to get to the stage and he was pumped up when he finally reached the podium.

“Thank you, all of you,” Will began. “I’ve never gotten a reception like this anywhere. And thank you for your support of Mars. Our landowners are Mars’s most reliable and devoted supporters, both individuals—who have a personal commitment to Mars—and corporations that have invested in the world’s development. The Americas were developed through a partnership of governments and private investment, and Mars

will be no different. Of course, the time came when outside government involvement ended; Britain and Spain no longer have official government policies or laws encouraging commercial development of the Americas. No doubt that time will come for Mars as well. But it hasn't come yet. It is the opinion of the residents of Mars that the time has come to settle the Red Planet, not just by an outpost of a dozen scientists and engineers, not just by a village of a few hundred experts, but by tens or hundreds of thousands, and eventually by millions. That is why we have called on the peoples of Earth, through their governments, to make a commitment to pay for the settlement of seven thousand people on Mars in seven annums, representing one per two million inhabitants of this world. I'm pleased to say that in Washington the other day I received a commitment from the President to settle three per million inhabitants of the United States, and last night in Ottawa, Canadian officials agreed to settle two per million, or sixty Canadians on Mars. So the commitments are beginning."

He had to hurry his last sentence because of the powerful applause that suddenly rose from the audience. He waited for it to quiet. "But the governmental commitments are not our only funding. The Commission has income sufficient to settle about four thousand people on Mars over the next fifteen years, and we hope that commercial interests will cover the costs of hundreds or thousands more. Governmental subsidies, if anything, make Mars an even more favorable environment for investment, because we know the place will grow and therefore we know there is demand for housing, vehicles, food, clothing, equipment, spacecraft, fuel, and energy. If we achieve the growth we hope to, privatization of interplanetary transportation will expand and privatization of transportation between Mars orbit and the Martian surface will be necessary.

He paused for more applause. “Our main reason for calling for the expansion of Mars is to protect humanity from extinction, either from an external threat—like an asteroid impact—or an internal threat caused by ourselves, like a pandemic caused by terrorism. That internal threat grows, year by year. If the twentieth century was the century of world wars, the twenty-first is the century of terrorism. Just this morning we experienced disruption of the sort that the continued unraveling of Earth’s fragile social and cultural consensus is causing. The United States, one of the most stable societies on this world, is now experiencing several major terrorist incidents per year. Other societies are far less fortunate and have thousands of victims every year. The rising tide of terrorism disrupts business, makes investment unpredictable, temporarily stops travel, slows economic growth, and polarizes the population of this world. The Middle East—the largest supplier of the world’s declining oil production—has seen the worst atrocities, with the result that oil prices are the highest in history.

“It is not clear to humanity where the solution to this growing menace to stability will be found or when the worst will be past. But Mars may escape the most extreme dangers. It already has a peaceful, stable, multicultural society. It has immense diversity, but the diversity is expressed in a context of civility. So far, we have rejected a highly competitive system for electing our civil leaders and the slander, rhetorical assassination, extreme claims, and efforts to fool voters into voting for one side or, more likely, voting against the other side.

“Ironically, the development of the Red Planet has reached a point where instability on the Earth is less of a threat to it than it was. In the first four years, there was constant danger that Project Columbus would repeat Project Apollo and get canceled.

Then the danger became stagnation rather than cancellation. But now, instability pushes up the price of Mars's chief exports—gold and, increasingly, platinum—compensating for declines in government subsidies. The rising price of oil has accelerated a shift to hydrogen supplied by solar, wind, and nuclear energy sources and caused platinum to double its market value just in the last year. Gold is now twice as expensive as it was two decades ago when one compensates for inflation, and it promises to remain there even though terrestrial production has doubled, because people are uncertain about the future. As a result, with every passing year Mars looks better and better as an investment.

“There is one very strong reason to have confidence in Mars's future: its dynamic, highly educated, idealistic, youthful, active population. Mars is receiving the Earth's best. When I say it will lead humanity to the stars, I am not exaggerating. The Americans and Russians both have had interesting beliefs about the succession of civilizations. For the Americans the torch of civilization has steadily passed westward, from Mesopotamia to Greece, Rome, Great Britain, and the U.S. For the Russians, spiritual authority has shifted from Jerusalem to Rome, then Constantinople, and finally to Moscow. But now in both countries a new succession is being hypothesized: to Mars. Whether one takes the succession of civilizations seriously as history or not, it represents a powerful myth, and myths shape reality. A new civilization has been planted in Aurorae, in the eastern end of Marineris canyonlands. That new civilization is already acquiring novel political structures, innovative art and culture, and unique social arrangements. And that civilization already feels the weight of destiny on its small, thin shoulders. It is ready to bear the burden and carry it to an unknown destination. It calls for, and welcomes, the

assistance of persons and corporations on Earth. So come to Mars, invest in Mars, and help us lead humanity forward.”

He was startled by a thunderous response from the audience. He had difficulty seeing them in the glare of the bright lights, but he could distinctly see some people jumping up and down with excitement and others cheering at the tops of their lungs.

Will went back to his chair on the stage and Heather Kimball walked back to the rostrum. He contemplated how much older she looked, compared to the flight she piloted from Shackleton Station to Gateway Station at the Earth-moon Lagrange 1 point in August 2035. She had been 40; she was 62 now. She had run the Mars Exploration Society for fifteen years.

“Thank you, everyone,” she said. “Commissioner Elliott can take some questions. You can send them to the podium’s email address.” And she read the address three times, slowly. Will could see many audience members busily writing out questions on their phones and attachés.

Kimball invited him back to the rostrum, where an attaché screen showed the messages rolling in. “Shall I select the questions?”

He shook his head. “No, I’ll choose.” He turned to the microphone. “Let’s see what we have. ‘Why does Mars need its own currency, and how can I get some?’” Will chuckled. “Officially, it isn’t a currency, it’s a ‘commercial transaction unit.’ One third of our imports are purchased in dollars, one third in euros, and one third in a dozen other currencies. They all fluctuate in value relative to each other. We export gold, platinum, fossiliferous rocks, nitrogen, argon, methane, oxygen, and water, and they fluctuate in market value. So we had to anchor our income and outgo projections to something, and it

didn't seem fair to use any existing currency because no one currency dominates. Hence the Martian dollar or 'redback,' worth twenty U.S. dollars, ten euros, and about a thousandth of an ounce of gold. As for getting some, we actually don't use much because handling paper currency and coins is labor intensive, so most purchases are made by credit card, allowing customers to check out their own purchases without a selling agent present. But we do have some bills and coins, and they leak back to Earth, where they have become collectors items. The Mars Authority is negotiating with a prominent mint to issue a series of commemorative redback coins for sale to collectors. They're also negotiating to produce commemorative stamps. Both should be available in a year or so.

“Here's another question. 'On Mars, abortions are not illegal. Could you please comment about the apparent contradiction between this position and Mars's claim to be a morally superior civilization.' I'm not sure we claim to be morally superior, but this question highlights how we do things on Mars. In the United States, after decades of legal abortions, a change in the Supreme Court declared it illegal; then a year later the court changed again and abortion was legal again; then the court changed a third time and abortion became illegal again. That's where things have stood for the last decade, and everyone knows that the current Administration will reverse the situation once it is able to appoint a new member. I think everyone would agree that on a matter of such importance, a seesaw of standards back and forth is not acceptable.

“Periodically we receive pleas or Jeremiads from people on Earth that we should ban abortions. They remain legal, but so far no abortions have been performed on Mars. We have virtually no teenagers, no poor population, and no population with a cultural expectation of births out of wedlock. Instead we have professionals who wait too long to

start a family and then have difficulties with their fertility. Columbus 11 saw the arrival of a professional surrogate mother; two more are on their way to Mars now because we have twenty-three couples trying to have children but apparently unable to do so. A law was passed by the Mars Council last year setting standards for compensating surrogate mothers, and anyone who has a child out of wedlock or who wants to put their child up for adoption can apply for surrogacy status. So we have solved the problem, in a way. Mars desperately needs more human beings, so we will support women having children, rather than forbidding them from having an abortion and then giving them no support for keeping the child.

“Here’s another tough question: ‘Mars appears to be going down the same road of exploitation and raping the land as Earth, by allowing private property and corporate investment. Humanity had a chance to make a fresh start, but instead it has fallen into the same old habits. As a result, if you lead humanity to the stars, it will be buying, selling, ripping vast holes in the ground, destroying nature, and spreading destruction as you go.’ As you can see, I’m not shying away from tough questions. The short answer is that I do not agree with the writer’s assessment that something is wrong with private property and private investment. Every society that has ever existed has had private property, and the larger and more complex the society, the larger the sphere of private property. No mechanism for collective property has yet proved to be as effective in both utilizing resources and preserving the environment. Perhaps a social mechanism for collective ownership will be developed some day, and Mars will be open to it.

“For those who want to experiment with collective use of property, Mars is probably the best place to do it. Less than two percent of the surface has been purchased;

less than twenty-five percent of the surface within five hundred kilometers of an improved road is owned. Because of three hundred billion redbacks of government and private investment, it is now possible for groups to move to Mars and set themselves up there. It is more expensive to move to Mars than to live there; the technology for raising food and recycling air and water is now well understood, mature, and reasonably priced. We already have five private groups on Mars, all religiously based, and one essentially runs a commune. So someone who wants to reject private property should come to Mars and show us what they can do with the idea.

“The most controversial decision we ever took on Mars was to create a bicameral legislature with one house elected by property owners, including corporations. Everyone regarded it as a backward step. But laws and policies that would be retrogressive on Earth can have the opposite impact on Mars. This decision has empowered tens of thousands of ordinary Earth folk to participate in the Mars experiment not only through ownership of land, but through voting. Corporations, it then follows, should have some voting rights as well based on their property ownership. Land is taxed, and there should be no taxation without representation, so land owners have representatives.

“Here’s another one: ‘How long will it be before the price of tickets to Mars will be affordable for the average person.’ A very long time, I’m afraid. The biggest factor in reducing the cost is access to low Earth orbit. Switching from xenon to argon for ion engine propellant cut the cost of getting cargo and heavy equipment out of 95% of the Earth’s gravitational well to a quarter. Solar sails have cut that in half again. Finally, the cost of the equipment—heat shields, avionics, life support systems—has dropped by half. But it still costs almost 1,500 redbacks to ship a kilogram to Mars, and it’s not likely to

drop much more without further breakthroughs in transportation to orbit, which is more than half of the total. We can fly a person to Mars now for fifty times the average American's annual income. Maybe we can halve it in fifteen years.

“The next one is interesting: ‘is the search for life on Mars over.’ Probably. We can say for sure there’s no life on the surface. We can say that the Hellaspontus geothermal system, which extends three kilometers underground, has an ecology of terrestrial microorganisms planted there sixty-five million years ago by an impact, probably by a fragment of the object that wiped out the dinosaurs. We can say the Elysium geothermal field is sterile in the places where we’ve drilled. We haven’t probed most of the Tharsis geothermal fields, but they’re smaller. The sediments of the old Borealis Ocean floor are now sterile. The chances of finding anything are extremely remote. It’s a shame; a billion years after Mars formed, it had quite a dynamic ecology, with thousands of species of microorganisms.”

Will turned back to the screen and laughed. “The next question is ‘Are you secretly in touch with intelligent life from another planet?’ This is a common rumor; there are still people who think my son Marshall was born by one. We really hate to disappoint anyone, but no, we haven’t been contacted by aliens.” The audience laughed.

He answered ten more questions quickly, then thanked everyone again and left. He had an appointment with Rick Page, head of the Lunar Commission. The limo took him three kilometers to the building complex that housed both the Lunar Commission and the Mars Commission; originally one building had held both, but the damage of the exploding nuke and growth of the two Commissions had resulted in their sharing space in three buildings. They entered via the Mars Commission’s grand entrance and walked

through to the lunar side where Rick Page greeted them. He and Will shook hands warmly. Rick, who was just two years younger than Will, had been in charge of NASA's earth orbital spacecraft repair operations, then had flown to Mars for two years, had returned to a job as an assistant commander of Shackleton Station under Sebastian Langlais, and when Sebastian retired Page moved up to the position of High Commissioner of the Lunar Commission.

He led Will back to his office, chatting all the way. "It's a shame you won't make it to the moon on this trip. Our facilities at Shackleton and LeMonnier are impressive. Grimaldi and Perry are pretty good, too. Shackleton can now house two hundred fifty personnel and fifty tourists and is bulging at the seams with requests for stay time. LeMonnier accommodates one hundred residents and fifty tourists. Altogether the moon can accommodate five hundred seventy people."

"It's impressive," said Will. "After racing the moon for fifteen years and always being behind it in terms of facilities, Mars is now ahead, but who knows whether that will last. The Shackleton vehicle repair facility is really impressive. The moon's networks of radio and optical telescopes are second to none; we still have nothing like them on Mars."

"It's time you built an optical network," replied Rick. "Olympus Mons would make an ideal location for an observatory, above the dust storms. Elysium Mons as well. Add a telescope up on the escarpment above Aurorae Outpost and one at Phobos, and Mars would have a vigorous network. We now have the ability to link up the lunar network with terrestrial scopes, producing a synthetic aperture of three hundred thousand kilometers! In another decade we should be able to link up with Mars as well. A synthetic

aperture of tens to hundreds of millions of kilometers would be able to resolve small details on the surfaces of Earthlike planets hundreds of light-years away.”

“We’ll have to look into that.” They reached Rick’s large, sunny, impressive office. They sat in comfortable chairs near the window where they could see the large fountain in front of the Lunar Commission’s main entrance. He offered Will some coffee and little pastries while Will scribbled a note on his attaché about telescopes. “How is the sale of land going?” asked Will.

“Pretty well. We don’t have a network of individual landowners as large as Mars’s, but it’s now fifteen thousand and growing. Almost everyone connected with the Commission has invested. Corporate investment has hit fifty billion dollars.”

“A lot more than ours, but the polar ice deposits are worth a lot.”

“Exactly. We’ve sold or leased two thirds of the deposits. We have separate representative bodies for the individual and corporate landowners instead of a common Landowners Assembly, and that has worked out pretty well. There’s now talk about establishing a Residents Council; we have a core of employees who have spent more than five years on the moon.”

“Continuously?”

“No. The record so far is twenty-eight months. We’d define a ‘resident’ as anyone who has spent six of the previous twelve months on the moon and let them vote or be elected to the Council whether on the Earth or on the moon. But the Residents Council will have much less to do than yours because it won’t have schools to finance and run. No one has had a baby on the moon yet. There have been three pregnancies and in every case the women flew back to Earth as soon as the pregnancy was detected.”

“One sixth gravity is far more adverse to human health than two fifths, and countermeasures are less effective. What would a Residents Council do, other than provide input into the planning process? The arts?”

“Yes, it’d fund the existing Arts Council, which would expand. But the arts are a tricky proposition compared to Mars. Lunar dance is pretty amazing, but the professionals don’t take it seriously yet because the practitioners, going back and forth between gravitational fields, can’t develop the reflexes and competence needed. Lunar painting is a niche market only, and we have no sculpture.”

“How much are you expanding the production of platinum group metals? The rumor says production will reach one hundred tonnes per year.”

“It might, but since there are four commercial producers and each has secret plans, it’s hard to say. A hundred tonnes is a good guess. That sort of scale should start to produce efficiencies. Shackleton’s solar power production is climbing fast; we’re putting arrays on any slope that has sun at least two thirds of the month. Eventually we’ll extend a power line down the Aristarchus, Nectaris, and Backside Highways and facilities will be able to get cheap electricity outside the polar regions, but that’s a decade away. Right now the companies haul nickel-iron to their processing facilities at or near Shackleton on dirt roads. There are now mining operations up to three hundred kilometers from Shackleton. What sort of platinum production is Mars looking at?”

“An increase, I’d say. My trip here makes me realize how important they are. The United States hasn’t made a policy decision to shift to fuel cells, but talking to people, I have been struck by how many households have been making efforts to get them—”

“Yes,” agreed Rick, interrupting him. “Solar cells are cheap enough to power a house at a reasonable price, and with the rising possibilities of terrorism, more and more people want fuel cells to store power at home.”

“Exactly, and to power their car! I was talking to someone in Ohio who had done that, in spite of the cost. People are afraid. They feel insecure. The United States has ignored the issue and as a result billions of dollars are being spent on European and Japanese companies and their equipment! But turning back to Mars. We have to make a huge effort to increase our platinum output because demand and price on Earth is skyrocketing and we can protect the Earth’s environment and scarce energy resources by exporting platinum group metals. Aurorae’s output is climbing to twenty-five tonnes per columbiad; that’s twelve tonnes per year. Cassini’s going into production as well and should produce half that. But now I want to at least double production every columbiad. We could get to a hundred tonnes per columbiad in four years and two hundred tonnes in eight. That means we’ll be producing several million tonnes of waste nickel-steel!”

“I know! But Earth would produce several times as much waste rock and consume vast amounts of energy. It sounds like we won’t be competing against each other for at least a decade.”

“Eventually we’ll kill terrestrial production.”

“If prices drop; that won’t happen any time soon. The big producers there are investing on the moon anyway. Personally I’d rather save as much of the Earth’s environment as possible. Our big problem on the moon is lowering costs. If workers stayed on the moon longer, we’d eliminate the cost of flying them there. The commercial firms are all signing contracts for a minimum stay of fifteen months.”

“Really? That’s a long time. But I guess it doesn’t harm health.”

“No, it doesn’t, though it destroys marriages. They’re getting lots of young adventurers attracted by the big signing bonuses who drink heavily on the weekends. You’re lucky, Will. Mars has a stable work force, plenty of electrical power, the ability to pursue nickel-iron deposits anywhere, and ample carbon dioxide.”

“We also have more expensive transportation to Earth, though; production costs are about the same on the two bodies. And you can now get carbon dioxide from Phobos pretty cheaply via solar sailers!”

“True; but the sailers haul your platinum back to Earth as well and cut your expenses.”

“How’s tourism doing?”

“You mean since the death?”

“That, the economy, and the difficulty lowering the cost of tickets.”

“I can’t say much about the death. A commission’s investigating, as are several private groups. It appears to be simple negligence. The guy ignored the spacesuit classes, violated safety procedures, and had a rather high, though legal, blood alcohol level. The family’s suing Lufthansa, but we’ll have to see how that plays out in the courts. Tourism is down ten percent, but it was down before the accident. I think that’s the best measure of the revolution in Khaliestan, the skyrocketing petroleum price, and the economic downturn. As for the cost of tickets, Mr. Swift says less government red tape could cut the cost of launching people to orbit ten percent.”

“What about lunar fuel?”

“We’re saddled with all the polar leases we made six years ago during the global depression. The income kept us going when government subsidies were slashed, but now the fuel making companies are claiming the leases prevent them from producing hydrogen and oxygen more cheaply.”

“But surely that’s spurious? They paid for long-term leases to plots with about two billion tonnes of water.”

“Yes, but they have to amortize the leases in twenty years when demand won’t be for more than about 100,000 tonnes of water. When they figure that into their costing formula, the cost of water to Gateway is pretty high.”

Will shrugged. “They won’t like it when Phobosian water starts showing up via solar sailer, then.”

“No; what’s your cost?”

“Phobos can produce water dirt cheap. We’ve got a shaft drilled all the way to the moon’s center now, where we can apply pretty intense heat and lose very little of the water and gasses released. We convert five percent of the water into hydrogen-oxygen fuel and that’s enough to get the rest to a sailer for transport to Earth. Rick, we’ll be able to put water at Gateway for maybe 70,000 redbacks per tonne, and we won’t mark it up fourfold like they do now.”

He laughed. “You’re kidding! You’ll completely kill lunar water production!”

“Not completely. But they’ll have to streamline their costs and trim their profits.”

Rick looked out the window, stunned. “Will, if you do that, you’ll kill ion propulsion.”

Will nodded. “Demand for argon will largely drop, shrinking an export market for Mars worth a quarter billion redbacks. Our water export market will bring in much less money as well; it’ll go from 300 million redbacks to 50 million. But the cost of transportation from low earth orbit to the moon will drop by a factor of two, and we’ll cut the cost of flying people to Mars.”

“And the cost of lunar tourism will drop. That could push up demand a lot.”

“You can’t say I didn’t warn you.”

“Lower your price gradually, please. The fuel production companies will be furious.”

“They’ll probably sue us; or maybe they’ll sue you. I’m sure I’ll get an earful on this trip, since the rumors are getting out.”

“Well, all anyone has to do is read the public reports about the first solar sailers. And I gather you’re investing a lot in the technology.”

Will nodded. “New materials, space manufacturing techniques, and a production facility on Phobos that goes on line in a few months. Right now we can’t transport more than a hundred tonnes per columbiad between Earth and Mars via the sailers; we only have twelve of them. But once we start to make twenty sailers per year, our capacity will climb fast. In ten years we’ll be able to transport several thousand tonnes per columbiad from Mars to Earth. We’ll be able to supply Venus and Mercury as well.”

“Sounds like we’ll be buying them from you, then going into competition with you.”

“No doubt. Hey, you all have to figure out how to establish a permanent population on the moon! Then you’ll have the capacities we’re developing on Mars.”

Rick shook his head vigorously. “Will, you’re able to develop those capacities because of a pool of experienced people on Earth; a pool of potential immigrants and one that supports you politically. The Lunar Commission anchors the Earth’s involvement in space. Don’t underestimate the importance of that.”

“I appreciate that aspect of your work. And you’re right about immigration; our best new workers are 30-ish, who have worked on the moon on and off for the last few years and now want to start a family.”

“I just wish you wouldn’t give them salary seniority based on their moon experience! It creates a brain drain for us!”

“It’s only fair, though.”

“True, but you should hear the conversations it creates in the Moon-Mars cafeteria.”

Will chuckled. “I bet.”

There was a moment of silence. “So, what do you hope to get out of this trip?”

“Pretty much what I’ve said. We can fund the arrival of 4,000 immigrants ourselves over fifteen years. We’d like to see commercial development and government subsidies pay for 7,000 more. If we succeed, including natural increase, Mars will have 20,000 people in 2072. Don’t ask me what they’ll be doing. Probably two thirds will be manufacturing consumer goods and providing support services, such as health and education. But the rest will be the most capable scientific, engineering, and exploration corps humanity has ever assembled.”

“That’s true, I’m sure. That’s an exciting vision.”

“It’s what drives me, Rick. It’s what drives me.”

## Beijing

24 Jan. 2059

Will Elliott remained in Houston a day and a half. Then after midnight the Elliott party flew to Colorado for a breakfast meeting in Boulder with various officials. They lunched with investors, engineers, and scientists in San Diego, attended the taping of two interviews in Hollywood that afternoon, supped with movie stars, then Will gave a public talk and press conference in the evening. Private meetings continued until midnight.

It was late when they boarded the jet again and made a twelve-hour leap over the Pacific Ocean to Australia. By crossing the International Date Line, they lost a day. They arrived in Sydney early in the morning and repeated the same whirlwind of private meetings, press conferences, television shows, and public appearances. The day ended with an evening visit to Woomera.

The next morning they awoke in Jakarta, Indonesia. Half a day of meetings with officials, a press conference, and a public talk followed. After an afternoon flight, the routine was repeated in Kuala Lumpur, Malaysia, starting at 5 p.m. At midnight the jet took off for Japan, where Will completed fifteen hours of meetings the next day. An overnight flight brought them to Seoul, Korea, and after a morning of meetings the jet carried the Elliott party to Beijing, where they remained a day and a half.

In spite of bitter cold weather and bad smog, the first day was informal and included sight seeing. It was an intentional hole in the schedule, left in case they got delayed. Marshall hadn't seen his father all that much for the previous few days and

enjoyed time with him at the Great Wall and around China's capital. That night, Will spoke to several thousand people at an auditorium in Beijing.

The next morning Will Elliott, Pierre Messier, and Krister Soderblom were ushered into the headquarters of China's space program for a tour of the facilities. Then they met its top officials over an enormous lunch. Dr. Tang Enlai, the oldest Chinese astronaut on Mars, President of Mariner Institute of Technology, a member of the Mars Council, and a leading exobiologist, was there; he had returned to Earth for a month on the same flight as Will.

As the dishes were removed and the tea came out, Dr. Cheng Weiming, Chief Administrator of the Space Program, leaned over to Will and said "Dr. Elliott, we know what you would like to get from China. Would you like to know what China would like to get from Mars?"

"Dr. Cheng, I would like to know how we can be partners. I have long been concerned that China has not had the opportunity it deserves to partner with us. The United States and Europe have their national interests. China has its national interests. But the Mars Commission has its own interests, and those focus on getting everyone involved in Mars. I'm sure my friend Dr. Tang can vouch for the nature of our efforts. We want Mars to be peaceful. We do not want it to be used as a platform for anyone's military. We want it to become a part of the overall economy of the human species. And we want it to be a diverse, multicultural society that represents a new kind of civilization; a civilization built on the pillars of many civilizations, not just a western or an eastern pillar. China, historically, has been the most powerful, sophisticated civilization on Earth. But so far it has not contributed to Mars in proportion to its importance."

Cheng listened and looked at Elliott patiently. “Your friend Dr. Tang has indeed spoken very favorably of your operation and of your personal fairness and integrity. I think he has made your task here easier. But it is our job to drive a bargain, isn’t it?”

“Indeed it is.” Will looked over at Soderblom, who had negotiated with the Chinese many times for the Commission, and Messier, who had made one or two visits to Beijing. They had told him that Cheng was soft spoken, but tough; he was beginning to see what they meant. But Will had long suspected that both men, as westerners, were not comfortable with China and wary of its interests in Mars.

“I can summarize what China wants very simply: we want parity. We want the same access to Mars as anyone else. I understand that your visit to Washington resulted in an agreement that the Americans would send a thousand immigrants to Mars over the next fifteen years. Your formula of one per two million citizens would mean that China should contribute 1,000 immigrants to Mars during the same period. While most of those people will end up working for the Commission, we want some of them working for our own interests. We also understand that the Americans arranged for use of half of Deimos for nuclear engine experimentation. The Americans already have a plant for enriching Martian uranium and they may start breeding plutonium there. Why should not China ask for the same?”

Soderblom and Messier shifted in their chairs uncomfortably. Tang stared at his boss intently, wondering whether he really was as fair as he claimed to be.

“Dr. Cheng, I think an equal commitment of resources and an equal commitment to create mutual trust do indeed mean that China should get the same.”

“You would be prepared to grant us a nuclear research reservation on the surface, just like New Hanford?”

“My friend Brian Stark, who runs New Hanford, doesn’t just allow inspectors from the International Atomic Energy Commission to tour the facility regularly; he has given me complete access. I’ve even had a tour. Would you grant me the same?”

Cheng did not answer right away. “And Deimos; would you lease the southern hemisphere to us?”

“Would you want it, with American surveillance equipment located just twenty kilometers away?”

“Perhaps we would.”

“Then perhaps we would lease some of the southern hemisphere to you. Not all of it; we already have a facility on the moon south of the equator. But we might be willing to lease thirty percent of the moon’s surface to you, retaining twenty percent as a buffer.”

“What about Phobos?”

Will shook his head. “Phobos has a different path. None of it will be leased out. It will be a borough within the year.”

Cheng seemed uncertain what that meant; Tang leaned over and explained. “Of course, any American lease over portions of Deimos will have to be approved by the Mars Commission’s Board when it meets in Paris in eight days. The same will be true of a Chinese lease. Both China and the United States are on the Commission’s Board. So they will see each other’s lease agreement and will have the opportunity to vote for or against each other’s application.”

“That should be an interesting discussion,” commented Messier. “What would be your understanding about the inspection of your nuclear facilities?”

“We will give the International Atomic Energy Commission’s inspector complete access,” replied Cheng. “We will grant Commissioner Elliott access as well, if he so desires. We would even consider a mutual inspection arrangement with the Americans.”

“Are you talking about inspection rights to the facilities on both the Martian surface and on Deimos?” pressed Pierre.

“Yes,” replied Cheng, displeased.

“There is another matter,” said Tang, looking at Cheng.

“Indeed,” agreed Cheng. “Our Jupiter 1 mission will be launched to the asteroid belt to test the equipment in less than two years. We would like to fly it via Mars.”

“No problem; we would welcome your crew and will be happy to sell them hydrogen fuel for the return flight at commercial rates.”

“Which are coming down quite a bit,” added Tang.

Will nodded. “We can sell water at Gateway for seventy thousand redbacks and hydrogen at Phobos for sixty thousand.”

Cheng was startled. “You’re talking about one seventh the current cost of hydrogen at Gateway and a fourteenth of its cost in low earth orbit, correct?”

Will nodded. “Correct. Our older equipment has been depreciated, but it still works. The newer equipment we are importing is much cheaper and we can make solar arrays cheaply on Mars now. We’d rather price propellant at the low end of what is reasonable than at the high end; it may cost us money, but it increases traffic, makes it cheaper to fly people to Mars, and stimulates exploration of the solar system.

Furthermore, unlike the moon, we don't have to waste the oxygen, because Phobos has carbon and we can use the spare oxidizer to burn methane.”

The Chinese turned to each other and conferred amongst themselves quickly. Will turned to the others around him. “Ça va bien?” he said in French, meaning “It's going okay?”

“Probablement,” replied Pierre, meaning “Probably.”

“Are you sure you can persuade the residents of Mars to accept all these changes?” asked Soderblom, switching to whispering English.

“The American demands will be as hard as the Chinese demands. Together, they may be easier to accept.”

“Parity may be popular on Mars; the residents don't trust the Americans.”

“They worry about both countries,” clarified Will.

The Chinese finished their conversation. Cheng turned back to them. “Perhaps I should add that any discussion of the commercial sale of hydrogen does not need to leave this room and is not part of the final agreement. You should be aware that once Jupiter 1 launches to Mars, there will be considerable speculation about whether the spacecraft will purchase hydrogen for a flight to Earth, the asteroids, or Jupiter.”

“When does the second launch window open?” asked Will.

“A few months after the spacecraft reaches Mars,” replies Cheng. “Let's drink some more tea and enjoy dessert. Then we can draft an agreement in detail.” He waved to some assistants and they went out. A moment later they wheeled in a table of delicate Chinese pastries. Fresh tea followed a minute later.

They began to draft in English and Chinese, the Commission's Chinese translator coming in to advise. The details, especially the ones involving money, were always complicated, and since the Chinese had governmental checks and balances, they could not guarantee that the funding for the agreement would be forthcoming. That was a problem in any agreement.

By 4 p.m. they had roughed out the terms fairly well. The details would be handled the next day by assistants. They all headed to a scheduled press appearance and photo opportunity, then to the space agency's main auditorium, where Will was scheduled to address the agency's staff and their families. As he walked to the back of the stage to await his introduction, Louisa Turner and Marshall arrived.

"How was the university?"

Louisa was beaming. "He's a chip off the old block, Will."

"It was fun," said Marshall. "I gave a sixty-minute lecture about the geology of Phobos to a planetary geology course and the thirty minutes of questions and answers all focused on Mars instead. The freshman geology class was less interested in the Noachian period of Mars; I had to switch to questions after forty-five minutes."

"We need to schedule him to speak about Mars to high school and university classes at every stop," said Louisa.

"Well, I've been sick most of the time since landing."

"You look tired, and your nose is running again," said Will. "I'd avoid a heavy schedule."

Marshall nodded and whispered "How did your negotiations go?"

Will looked around. Hidden microphones were unlikely in such a setting, but not impossible. He turned his head so Louisa could hear as well and whispered. “The Chinese want parity with the United States, but they don’t want to pay. So we had a lot of delicate discussions. In the end they paid about the same amount, which is a fair price.”

“You mean they paid for a thousand settlers?”

“No, they’re sending 1,600 for the same rate as the U.S. They’re also paying the same amount for a nuclear reservation the same size as New Hanford, operated under basically the same rules. And they’re leasing a third of Deimos, around its south pole.”

“Two nuclear facilities?” Louisa was shocked. “It’ll never fly, politically.”

“Well, the U.S. has two.”

“But it’s the U.S.!”

“And China is China. Mars shouldn’t get involved in Earth’s fights. We need people, technology, and facilities. And we’re getting them. We’re also getting a richer culture.”

“A potentially schizophrenic culture!”

“Then it’ll be just like Earth’s. We can handle the ethnic diversity. There’s more cultural unity among educated professionals than many think.”

“I hope you’re right!”

## Paris

2 Feb. 2059

The visit to Beijing was long and successful. The public talk Will gave in the space agency's main auditorium was followed by a reception where literally a thousand English-speaking Chinese scientists and technicians sought to meet him at once. China had plenty of trained people willing to emigrate to Mars. They remained at the auditorium several extra hours to meet and talk to people.

That night they flew southwestward and as dawn greeted the plane they were over the snow-covered and cloud-enshrouded Himalayas. After catching a brief glimpse at Mount Everest—the only way to see it, since guerilla groups had closed the area—the plane began to descend to New Delhi. The day was a whirlwind of press conferences, public meetings, and meetings with government officials; a little sight seeing included a visit to the spectacular Bahá'í House of Worship. Overnight they flew to India's Satish Dhawan Space Centre in Sriharikota, Andhra Pradesh, and repeated the round of meetings there, including a rousing speech to a dozen Indians about to climb into a Boeing Model 177 Shuttle and blast off for the caravel *Polaris* and fly to Mars. They finalized agreements late into the night. India was not to be outdone by China where immigration was concerned; they pledged 1,500 settlers over fifteen years.

An overnight flight took them to Islamabad, Pakistan. The first half of day Will met with officials, conducted a press conference, and gave a public talk. Then at 2 p.m. the jet carried them to Tehran, two and a half hours and one and a half time zones to the west. By 4 p.m. Will was speaking to two thousand people at a very large auditorium at

the University of Tehran, followed by a press conference at six. The rest of the evening he was meeting with various officials.

They rose the next morning as the plane approached Riyadh, Saudi Arabia, after a lengthy detour around Khaliestani air space because the country had threatened to shoot down the plane. A long morning of meetings with government officials was capped by a press conference and a brief public appearance at the airport, then the jet took off, officially for Turkey and a free day. But as soon as the jet reached the Mediterranean, it turned southward to Israel. Will and Marshall were able to spend the late afternoon and evening praying at the shrines of the Bahá'í World Center, a brief but memorable pilgrimage to the sacred center of their religion.

The next morning Will was in greater Tel Aviv for the usual routine. By late afternoon he had arrived at the University of Ankara in Turkey's capital. After the press conference and talk he had a long and sumptuous dinner with Turkish officials and businessmen anxious to increase their country's role on Mars. He slept on the brief flight to Moscow and rose at 2 a.m. to meet several Mars Commission officials.

The last day of January was packed with events; two public appearances, one press conference, long discussions with government officials, and a difficult staff meeting at the Space Construction Institute, formerly an agency of the Mars Commission but now an independent institution. The transition had been very difficult and was much resented by the employees. Will knew that economic arguments would largely fall on deaf ears, so he was as compassionate as possible and listened. Russian officials, angered that their contribution to the Mars Commission no longer supported the Space Construction Institute, were not inclined to be generous. They pledged no additional funds for Mars.

After midnight the jet departed for Warsaw, where a very busy half day of events was planned, followed by another half day of events in Berlin, a sixty minute flight to the west. The day closed with a dinner in Munich with Gerhard Muller, then a night flight to Paris. Will rose early to have breakfast with an old friend.

“Daoud! How are you!” he exclaimed as David Alaoui, his old buddy on Columbus 1, came on board.

“Will, you haven’t changed in twenty-one years!”

“Haven’t changed? I’ve got less hair on top!”

“Not much less; look at me!” David tilted his head forward to reveal a large bald patch on top.

Will laughed. “We’re getting old!”

They embraced, then stood there a minute, smiling at each other. “We have a lot of catching up to do, and only a little time to do it.”

“You’re late, actually.”

“I didn’t think you really wanted me here at 5:30 a.m.”

“But I did! This is our only time to chat, unless you want to catch the flight to Seville with me tomorrow.”

“Sure, I could clear the calendar for that.”

“Good. It’ll spare me from two hours of business calls and other work. This plane has complete communications service; when we’re in the air I’m as busy phoning people and doing interviews as I am on the ground.”

“You’ve taken the Earth by storm! It’s been a slow news month. No terrorist incidents, no reign of terror in Khaliestan, no big political developments, no nasty economic news. . . every time I turn on the news I hear you’re visiting somewhere.”

“We’ve gotten very good coverage. In the last three weeks fifteen thousand people have purchased twenty million redbacks of Martian real estate and twenty companies have purchased fifty million more. That’s two years of business. Here, let’s sit at the table in my room, where we can talk. Breakfast is already prepared.”

“Really?”

Will nodded. “This plane comes with a kitchen and a cook. It’s very convenient. The place is a bit cramped, but it allows us to sleep any time we want, and we don’t have to stay in hotels.”

“And don’t have to worry about surveillance.”

“I’m not so sure of that. But security is better.” Will led David back to his private room. “How’s the Venus-Mercury Commission?”

“Great. With the new caravel we’ll expand our Venus orbital crew to twenty-five. We’re landing an expanded surface facility later this year, too; did you hear?”

“Yes.” Will closed the door behind them. They sat at the table and loaded their plates with fresh fruit, toast, cereal, and yoghurt. “It’ll give you what, fifteen cubic meters of air conditioned space?”

“Yes, exclusive of the airlock. It operates at 150 Centigrade, which is about the hottest we can build robots to work normally. That’s better than the last robotic repair facility, which had to operate below 100 centigrade.”

“Or tried to; the air conditioning didn’t last very long. I must say, I am impressed by the extent you’ve explored Venus telerobotically in a bit over a decade. Every major terrain type and every region has been visited, half a tonne of samples have been flown to orbit for analysis, plans to extract deuterium from the atmosphere are advancing—”

“With two caravels docked together, with a hundred tonnes of Phobosian water for radiation shielding, we’ll have a good sized, comfortable, fairly low radiation environment, a safe orbital station; good enough for raising children, frankly.”

Will smiled. “Why not. How’s family life going on Mercury?”

“Pretty well; they have three children there and another one on the way. Concord Outpost soon will have 5,000 square meters of buried housing and 5,000 square meters of greenhouses. It can accommodate fifty, and I’m pushing for the number to be raised to one hundred within a decade. Mercury is a fascinating world! I wish I were young enough to visit it myself!”

“That’d make you the first human being to visit all five terrestrial planets.”

“My wife won’t let me go, though.” David shook his head. “Did I tell you Aisha was diagnosed with breast cancer last month? Stage two; it’s aggressive. They’re confident they can beat it, but it’s quite a scare.”

“I bet. We’re at the age when medical surprises creep up on us.”

“That’s true, but now she won’t even let me fly to the moon or Gateway; she wants me to stay close.” He sighed. “I hope that’ll clear up in a year or two.”

“Would you really go to Mercury?”

David nodded. “Of course. If the Mars Commissioner can come to Earth, why shouldn’t the Venus-Mercury Commissioner visit Mercury?”

“That’s true. The round trip would take what? A year?”

“Fifteen months. An opportunity is coming up, too.”

“Are they going to mine gold in Caloris?”

“Definitely, it’s a good deposit. They’ll set up a platinum group metals separation facility at Concord, since there’s a lot of meteoritic material at the north polar zone and we have plenty of carbon dioxide and rocket propellant there. Later, we can haul in meteoritic material by robotic truck. We might as well get some of the money for the switch-over to the hydrogen economy as well.”

“Agreed. And if you buy solar sailers from us, you can haul metals back to Earth cheaply.”

“Or we can build our own sailers. We’re funding research into a new design that may be easier to control. In that case, you may be buying sailers from us. Our folks on Mercury know something about sunlight, you might say.”

“How are you holding up under the pressure of running an international agency?”

David laughed. “It takes a certain personality, and I’m not sure I have it! Politics breed a certain absurdity and idiocy, doesn’t it? One never gets used to it; one just does the best one can. You’ve been isolated from that on Mars, at least.”

“From the terrestrial side of it, yes. We have our own difficulties on Mars, of the ‘herding cats’ variety. Marsians are independent. This trip has been a real eye opener. Not that I didn’t know about the fights between the French and the other Europeans, the Americans and the Chinese, the Chinese and the Indians, the Europeans and the Americans, the Arabs and the Israelis, the Brazilians and the rest of Latin America, etc. These are quite old. I was receiving monthly reports about the political balancing that

was necessary. But actually being immersed in it . . . I'm glad I'm going back to Mars! The partisanship has grown much fiercer and more bitter than it was twenty years ago."

"That's true in everything," agreed David. "French politics has become loud-mouthed, angry, black and white, polarized, and all-or-nothing. It's extremely difficult to get anything done. In other words, it has gotten as bad as the U.S. was ten years ago. I hesitate to think what we'll do when it gets as bad as the U.S. is now. We've attached Mercury initiatives and funding to one party and Venus to the other, and tried to make as many of our projects applicable to both as possible."

"It's absurd. We have to hire two powerful and expensive lobbying groups in Washington, one for each party, and we have to coordinate our message very, very carefully to reach both rhetorically without seeming to contradict ourselves. I don't know how anything gets done."

"A lot doesn't get done. That's why German social security went bankrupt ten years ago, why Italian social security has gone bankrupt twice, why British health insurance was unfunded for two months in 2054, why the Japanese economy has been stagnant for eight years, and why the United States dollar almost collapsed in value six years ago. People weren't willing to do unpopular things that were necessary. It's also why several Asian and Latin American countries have gone backwards from dysfunctional democracies to dictatorships in the last five years. Morocco's very limited democracy is under severe stress because of the fanaticism of a minority."

"Yes, and the terrorism a few produce. I'm pessimistic for the near-term future of humanity. I suspect by the next century we'll have resolved some of the social conditions that cause terrorism and severe partisanship. I just hope we can hold Mars together until

then, or even better, that Mars can demonstrate solutions. I'm convinced a vigorous democracy without partisanship is possible and I'm putting more of my energy into creating a culture on Mars that will allow discussion but steer away from parties and the electoral competition they produce. Over time, competition for votes has produced viciousness and polarization."

"But how will you prevent it?"

"By example, and by keeping a dialogue going. I'm inviting the Mars Council members *en masse* to my house for dinner every week when they're in session. The Aurorae Borough Council as well. I'm also inviting any pair of members that seem to have trouble with each other. I can keep up because we're small, but I hope the result will be a culture of interaction and bridge building."

"You can do it because of your position, too."

"I hope it isn't my power as much as my prestige, because I'd like to retire in a few years and devote my energy to the culture and civil society of Mars. And I wouldn't mind doing a bit more geology, too."

"I'm looking forward to retirement, too. I never thought I'd say that."

Just then the door to Will's room opened and Marshall stuck his head in. "Good morning."

"Come in and meet David. David, my son Marshall!"

Marshall entered and Dave rose. He shook hands with the younger Elliott with a smile. "Pleased to meet you, Marshall. I've heard about you all your life; now I can finally meet you!"

"The same; I've heard about you all my life. It's really good to meet you."

“What are you doing today? It’s Sunday; no university classes to give.”

“No. I’m scheduled to speak at the Bahá’í Center in Paris at 11 a.m., but otherwise the rest of the day is free. Dad’s going to be in rather high-level meetings all day, except the public talk when he will say something I’ve already heard twenty times.”

David laughed. “Good. Do you want a tour of Paris? I can drive you around, we can walk around Montmartre, go to the top of the Eiffel Tower; the weather today is supposed to be a bit cold, but sunny.”

Marshall was delighted. “I’d really love it!”

“Good. I can pick you up at the Bahá’í Center at what; 12:30 or 1?”

“Sure. Do you know where it is?”

“Yes, rue Pergolèse. I’ve been there!”

“Wow. Alright.”

“Go wash up, then come join us for a while,” suggested Will. Marshall nodded and stepped back out.

“He’s all grown up, Will. I can see your eyes in his face.”

“Yes, and he has Ethel’s nose and hair color. He’s a good kid, Daoud. I think he’ll do well at MIT. Where are your boys right now?”

“Solomon’s a professor of electrical engineering at Strasbourg and Musa’s a businessman in Fez. They’re 34 and 31; it’s hard to believe they’re all grown up. Musa’s got two kids, Solomon has one. Musa was working here in Paris, in the Défense section, when the nuke went off there. His wife has refused to move back to France ever since. Of course, a car bomb went off in Fez two years ago, so it’s not really any safer there.”

“No, but terrorism’s a very emotional thing.”

“Solomon’s wife, by the way, has a Moroccan Bahá’í cousin. She’s a very nice person. That’s how I ended up at the Bahá’í Center; they invited me to speak there.”

“They did? On what?”

“Islam and science. Of course, I got a death threat from an Islamic terror group afterward.” David shrugged. “That’s life.”

“Yes, life in the mid twenty-first century.”

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The rest of the day was stressful and required great tact. The twenty-four national representatives on the Mars Commission’s Governing Board met all day, part of it with Will. Will’s offer to lease the northern hemisphere of Deimos to the United States was only slightly less controversial than his offer to lease much of the southern hemisphere to China. The nations had been discussing both plans informally; China and the U.S. had sent delegations around to the others, with everyone demanding support for some pet project of their own in return for support for, or against, the other two.

“I almost missed my public appearance at the Mars Commission’s auditorium in order to resolve the mess,” Will said to David that night. They were sitting at the Alaoui family’s dinner table, the remains of a huge couscous dinner still heaped on a platter in front of them. Marshall was sitting with them, drowsy because it was 1:30 in the morning; Aisha had just retired. “I had to meet with the Board just half an hour before I was scheduled to appear before 3,000 people. I made a plea to accept the notion that Mars needed both nations to invest, for its future and for the sake of balance in the exploration of space. Of course, neither the U.S. nor China want balance; they want dominance. But the others understood my point.

“I spoke to Helene about 10 p.m.,” said David, referring to Helene Dupont, the French representative to the Commission. “She said that was the turning point. After that, several nations were willing to vote against both plans if they both didn’t move forward.”

“I knew Helene would get the point. It’s been French policy to balance the United States ‘hyperpower’ with someone else—anyone else—since the fall of the Soviet Union. Since Europe has never congealed as a real hyperpower, China is the next best thing.”

“Helene didn’t need help to get the point, but I suppose some of the others would, like Japan or Korea. She also said the U.S. asked that the Chinese request be postponed to the next meeting in six months on the grounds it wasn’t on the agenda and the Chinese nearly erupted! That shocked people. It would have decoupled the proposals.”

“That’s not all.” Will smiled. “The U.S. relented in its opposition because it was sure the Chinese wouldn’t be able to send anyone to Deimos for at least a year and a half. But after the Commission Board meeting broke up, Dr. Cheng told me we could expect a Chinese vehicle with twenty-five on board to arrive in eight or nine months.”

David was shocked. “Really? They must have had a contingency plan!”

“A launch to Mars takes a year to plan,” agreed Will. “Opposition is four weeks away and any fast launches to Mars must occur in the next two or three weeks. This is going to be an interesting columbiad.”

“Did the Board approve everything?”

“The Board approved the long-term plans in principle, subject to financing. Brazil and Argentina made their pledges at the meeting today, even before my visit to them; they’ll commit to 40 and 200 citizens respectively, which is one per million. The twenty-four member states have together committed to fund 5,000 positions, which is roughly

one per million for their populations. Some countries went over, like the U.S., while others pledged less, like Spain and Russia. We've also received pledges from thirty other countries for six, or twenty, or whatever; they total five hundred more. We'll probably collect pledges for another thousand from the remaining hundred-fifty nations. Pierre Messier has started contacting them, and I'll be busy making calls the first week after trans-Mars injection when live conversations are still possible."

"Impressive. We'll have to try something similar for Mercury in another few years when the facilities are ready for a major expansion. There's no reason why Mercury shouldn't have thousands of settlers, some day. It's got resources, gravity, and fascinating science."

"It does indeed."

"I suppose I shouldn't ask, but what price will we pay for this deal with China?" exclaimed Marshall. "Because the U.S. won't forget."

Will nodded. "I don't know, but I fear you're right." He looked at his watch. "I had never thought I'd be eating cousous in your house until 2 in the morning! It's been a very long day. The taxi should be out there; we scheduled it for 2 a.m. We have to get to the plane so that we can get some sleep. I have an 8:30 a.m. breakfast meeting with the heads of staff of our Seville facility."

"Soon to be former Mars facility," said David. "Good luck with that. I suppose you will have long and tense meetings with Spanish government officials."

"For sure. They haven't made any pledge to send additional citizens to Mars, either. But we have to spin off regional research centers if we ever hope to reduce our

terrestrial costs and move our research to Mars. The Mars Commission ultimately is about jobs on Mars, not on Earth!”

“The Mercury Commission’s sending a research project to Seville—growing raspberries on Mercury—so that will help.” David rose and glanced out the window.

“The taxi has just arrived. I hope we’ll see each other again, my friend.”

“I do, too.” The two men hugged, then David kissed Will on both cheeks, as was customary in France.

“Did you thank him for your day?” Will asked Marshall.

“Oh, about a dozen times!”

“We painted the city red,” said David. “I gave him the five hour quick tour of all the major sights.”

“He walked my legs off,” added Marshall. “I’ll be back, Uncle David, don’t worry.”

“Good. I’ll be going to MIT in June; you can show me around Boston then.”

“I will.”

They walked to the door and put on their coats, then headed out into the cold to get into the taxi.

## Kourou

8 Feb. 2059

Seville was indeed a long and tedious day; Spain was proud of the Space Agriculture Research Facility, resisted its privatization as much as possible, and refused to pay the transportation of any of its staff willing to continue their work at Aurorae Outpost. The celebration of Seville's many significant accomplishments was bittersweet.

Spain was followed by a day in Italy and a day in Britain. The latter included a trip to Edinburgh to join the MacGregor clan, which was thrilled to welcome the relatives from Mars. Ethel attended the entire event by videophone. The evening concluded with a stop at the graves of her mother and father and a long visit with Gina, Ethel's sister. Before midnight they were back on board the jet, which was bound for Nigeria.

The day in Nigeria included visits with Nigerian officials, a public talk, a press conference, an appearance in Port Harcourt, Iboland, the homeland of the Universal Church of Jesus Christ and the Creator, and a meeting with several dozen businessmen from all over western and central Africa interested in investing in Mars. An overnight flight took them to Buenos Aires. A whirlwind of activities all morning was followed by a flight to Brasilia for a meeting with Brazilian officials and a public talk in the afternoon, then a flight to the Brazilian spaceport for a talk and tour that night. The jet then departed for Kourou, where they awoke the next morning.

France's spaceport at Kourou, Guyana, equaled Kennedy Space Center in size and traffic. Each sent one third of the world's spaceships to low Earth orbit. A brand new Boeing Model 277 shuttle awaited Will. Since boarding was scheduled for 6 p.m., they

had most of the day for a tour, public talk, meetings, and a medical checkup. Marshall made a trip to mangrove swamps and tropical forest nearby while Will held his last round of meetings with space officials. Then it was time for goodbyes.

“It was a very successful trip, Will,” said Louisa Turner. “We’ve received unprecedented publicity, and the hours on cable, television, and radio keep climbing. It’s been more than a trip; it’s been a phenomenon.”

“I had an incredible time,” Will said, his voice hoarse from overuse. “Twenty-three countries in about the same number of days. I now have a much better understanding of the situation you all face when implementing our goals.”

“You’ll find it an order of magnitude easier to communicate with colleagues and potential friends of the Commission, because you’ll know them,” said Pierre.

“I’m sure that’s true. This trip will pay for itself several times over.”

“And you raised our budget substantially,” added Louisa. “That’s historic.”

“I bet we get only two thirds of the money pledged,” replied Will. “That’s the history.”

“Maybe, but with the Chinese and the Americans in competition, neither can back down very much,” said Pierre.

“True.” Will turned to his son. “You have a safe flight back to New England, and give grandma a kiss for me, okay? Tell her I’ll be back in four years.”

“I hope you’ll be able to attend my graduation at that time.” Marshall had tears in his eyes. “Thanks for the tour of Earth, dad.”

“Thanks for coming along.” Will hugged his son, then kissed him. “Be careful, Marshall.” His voice broke a bit from the emotional strain.

“I will, dad. You take care, too.”

“I will. Mom wants to see both of us home, safe and sound.”

“I know, and I’ll be coming home in a few years.”

“Good.” Will turned to the others and nodded. He gave them all a hug. Then he walked down the jetway to the bus waiting to take him to the launch pad. In ten minutes he and the other passengers were riding the elevator up to the passenger cabin some sixty meters above the concrete launch pad. The Boeing Shuttle had a small, efficiently packed cabin. The lower floor, six meters in diameter, held eleven acceleration couches for the passengers, each of which could be closed off with curtains for privacy, and a bathroom. The next level up, only 4.5 meters in diameter, was a single lounge with a zero-gee kitchen and a couch for one more passenger. Above that was the control capsule three meters in diameter, accommodating two crew; finally the nose itself held the docking apparatus and tunnel. Will stowed his personal gear and found his couch. The cabin was wide open and the eleven of them laid there and chatted while the shuttle underwent final preparations, including fueling with liquid oxygen and slush hydrogen.

Finally the countdown began, then ignition and the rapid, loud acceleration skyward. Some considered launch the ultimate experience, others the ultimate terror. Terrestrial shuttles were louder than Mars shuttles, the acceleration was more crushing, and the shaking was much worse; Will was startled by the experience. In five minutes the first stage dropped away and the vehicle pitched over to accelerate horizontally, giving an incredible view of the Earth receding away from them. In fifteen minutes the second stage shut down as well and they coasted into orbit, weightless.

The chase to dock to the refueling facility in low Earth orbit began. The pilots were skillful and the software highly sophisticated; the use of global positioning satellites allowed very precise, instant calculation of the shuttle's position and speed. As a result, docking occurred only five hours later. Once docked to the refueling facility, the shuttle and facility began to rotate to provide enough centrifugal gravity for the pumps to transfer fuel. In an hour the shuttle's tanks had fifteen tonnes of hydrogen and oxygen from the moon. The shuttle undocked and an hour later fired its engines again, heading for a rendezvous with the two Mars-bound vehicles, which were already flying toward the Earth for trans-Mars injection.

It was almost a day before they saw the *Polaris* 150,000 kilometers from the Earth. Floating nearby was a nuclear thermal engine and two hundred tonnes of hydrogen to push the caravel to Mars. The Swift shuttle fired its engine to match the caravel's trajectory toward Earth—the caravel had left Gateway two days earlier—and headed for the docking unit. It took six hours to close on the *Polaris* and achieve a hard dock.

The twelve of them were the last ones on board. A bit over a month earlier, twenty-four personnel had flown from Mars to Earth inside the *Polaris*. They had rattled around the big, empty space. But in the month since, shuttle after shuttle had taken off from seven spaceports around the world, refueled, and flown to Gateway with twelve passengers each. Now the *Polaris* was packed with one hundred twenty-five people. The once-spacious staterooms were divided into tiny private spaces. Several months earlier three other caravels had departed for Mars with one hundred twenty-five people each; they would reach the Red Planet in a few months. The twelfth columbiad would see Mars receive five hundred settlers, swelling its population from 1,100 to 1,600.

They had eighteen hours to wait before trans-Mars injection. Half that time Will slept; he was utterly exhausted from his world tour. An hour before the *Polaris* came within two hundred kilometers of southern India, its rotation stopped and they were temporarily weightless again. As they skimmed the outermost wisps of atmosphere, the nuclear engines roared alive. In fifteen minutes the hydrogen was consumed, imparting an additional 9,000 meters per second of velocity to the ship, making it the fastest passenger vehicle ever to leave Earth. When the engines fell silent the *Polaris* was on its way to Mars in a bit less than six months.

The ship's rotation was resumed and like almost everyone, Will headed to the cafeteria for a meal. For him, it was breakfast; for another third of the passengers, who were on a schedule shifted by eight time zones from him, it was an early supper; for the last third of the passengers it was a post-midnight snack. But the cafeteria could only accommodate fifty people at a time, so Will had to take his coffee, bagel, and fruit to a nearby conference room nearby to eat it. There he sat on the floor next to a young man with dark skin and hair who was a bit surprised to have the Commissioner sit with him.

Will saw his surprise and offered his hand. "Will Elliott."

"Yes, I know. I'm Robert Abraham Kampala."

"Pleased to meet you, Robert." They shook; Kampala had a hand-crushing grip, so powerful it startled Will.

"I'm surprised you don't have a captain's dining area or something."

"No, even the commander of the ship doesn't have that. All I have is my room, just like everyone else. I do have a single room because it doubles as my office."

"I suspect you have a fair amount of work to do."

“Yes, exactly. What do you do, Robert?”

“I’m a mechanic, on my way up to the garage in Aurorae.”

“You must be good.”

He smiled. “Thank you. In fact, I can fix anything. Give me something broken, don’t even tell me what it is, and I can figure out how to fix it.”

“It sounds like a gift.”

“It is. You know the stories about Mozart making beautiful music by the time he was three years old? Well, by the time I was three I was taking apart everything around me and putting it back together. I’m a Mozart of mechanics.” He smiled. “I’m a reincarnation of Mozart, actually.”

Will didn’t want to look surprised. “Are you planning to stay on Mars?”

“I suppose. It’s too bad it’s so damn expensive to live there.”

“It isn’t easy at first, but every year your income goes up and the situation improves. We’ve found that a seniority system gives everyone an incentive to stay and gain experience.”

Robert shrugged. “I don’t know how anyone can stay on twenty thousand redbacks a month, though.”

Will was surprised. “No, that’d be difficult. But you can raise that to twenty-four thousand pretty easily by taking courses on the flight out. There are all sorts of skills we need, and the more of them you arrive with, the more money you can earn.”

“I know. Emergency training especially raises income. The spaceport interests me some; I’d enjoy fixing shuttles. Maybe I’ll take a course on rocket engines.”

“That’d help. You could even get assigned to the crew maintaining the caravel’s engines; it’d give relevant experience.”

“I’ve thought about that.” Robert’s voice trailed off; it was obvious he hadn’t followed through.

“What are you doing on the flight out?”

Robert shrugged. “A few chores. I’m curious what tasks you have.”

“I’m chef in charge of the kitchen every Saturdaysol during my primary shift. I’m looking forward to it, too; I’m a pretty good cook and haven’t had much chance to cook for the last twenty years.”

“Saturdaysol. . .” His voice drifted off. “Why don’t we just call it ‘Saturday’?”

“Well, try calling someone on Earth and saying to them ‘It’s good to talk to you, let’s plan to talk again Saturday’ and they then have to reply to you ‘Do you mean Saturday on Mars or Saturday on Earth?’ Using different terms makes it clear which you mean.”

“I suppose that’s true.” His voice trailed off again, as if he didn’t care. Will looked at him closely, trying to figure out this very strange immigrant.

“Where are you from, Robert?”

“Several places. I’m a citizen of the U.K. and Uganda, but I’m really not very welcome there. My mother’s family is Ugandan—they’re from a tribe in the central part of the country—and my father’s family ultimately came from Goa, the Portuguese colony in India. My great grandparents arrived in Uganda after World War II and built up a business there, then were kicked out by Idi Amin. My grandfather started up a business in

London, then was able to return later in his life with my father, who married my mother, then they all had to leave.”

“So, were you ever in Uganda?”

“Two years; same with India.”

“Interesting. Well, now you get to be a Marsian.”

“I suppose. A strange notion, to be a Marsian. . .” He carefully pronounced the “s” to say *Mar-zee-an*. He repeated it twice more. Anything pertaining to the natural environment there was *Martian* but anything pertaining to humans was *Marsian*.

Will watched him. But then someone else came up to him, a woman with skin almost as dark, though she appeared to have more blood from India in her veins.

“Commander, I wanted to tell you how much I enjoyed and appreciated your talk at Satish Dhawan. It was a great inspiration.”

“Thank you. Were you on the shuttle flight that left from there the next day?”

“Yes, I was one of the shuttle-load of Indians who heard you right before launch. We were all very inspired.”

“What is your profession?”

“I’m a nurse. I should introduce myself. Sara Pannakar.”

They shook hands. “And where in India are you from?”

“Goa, southwestern coast of India.”

At that point Robert leaned over. “Goa? My great grandparents were from there.”

“Really? Small world. I thought I would be the first Goan on Mars.”

“I’ve visited the city once or twice. I’m not actually from there.”

“Then where are you from?”

Robert shrugged. "Good question. I guess the U.K., but I lived in six countries growing up."

"A world citizen," said Will.

"A man without a country," replied Robert.

"I've traveled around as well," said Sarah. "My parents lived in the U.S. for a while, then when I was eleven they spent a year in the Netherlands."

"What did they do?"

"My dad was a physics professor."

"They must be proud of you," observed Will.

"They are, though they want me to get married and start a family."

"How old are you? About twenty-nine?" asked Robert.

"Yes, exactly," she replied.

"Me, too," said Robert, with the slightest of smiles.

Will rose. He had finished breakfast. "It was good to meet both of you. Looking forward to talking more during the flight out." He headed out of the room while Robert and Sarah continued to talk. Will returned to the cafeteria to bus his tray and dishes, then headed for the elevator to descend one level to his quarters. When the elevator doors opened, Brian Stark stepped out.

He saw Will in front of him and scowled. "Will, you're a traitor to your country."

Will was startled by the accusation. "What?"

"That's right, Will. We had an agreement that you wouldn't lease to the Chinese."

"What? Brian, we had no such agreement. Read the document we signed."

"Will, it implies that you won't lease any of Deimos to the Chinese."

“It says no such thing. It was silent about China.”

“Will, you can’t promise to lease half of Deimos to the U.S. without promising you won’t lease the rest to someone else!”

“Who says? The agreement says no such thing!”

“Flights to Embarcadero can’t fly over our reservation; did you agree they can’t fly over the Chinese facilities as well?”

“How could we do that? They have to fly over something.”

“And now the Chinese can fly satellites in Mars orbit to overfly our facility and spy on it.”

“And vice versa. The agreement said nothing about that, Brian, and it couldn’t; legally, Mars orbit is unrestricted, just like Earth orbit. Nations have been putting satellites in Mars orbit for seventy years; the precedent is set.”

“And good seismometers and accelerometers on their side of the moon can tell them all about our test firings.”

“So can spectrometers studying the expelled hydrogen; the Chinese multitelescope array at the Earth-Sun L2 point can do that. And the United States can do the same to them. Maybe a little bit of basic knowledge about each others’ research is a good thing.”

“Will, we signed an agreement that gave us freedom from surveillance.”

“No we didn’t. The Chinese can launch spy satellites into Mars orbit and no one can stop them. Did you think they wouldn’t do that?”

Brian shook his head. “And now we’ll have them at Aurorae as well, watching New Hanford.”

“Not exactly. Their nuclear reservation won’t be at Aurorae.”

“No?”

Will shook his head. “Dawes or Cassini. But I’m sure both of you will be spying on each other, and the International Atomic Energy Commission will be watching both.”

Brian pointed at him. “Now I see your motivation. You want two of us to check each other!”

“No, that’s not true. It is true that two equal rivals will watch each other and sometimes they may check each other. Sometimes they’ll get together and gang up on you, also. If someone wants to lease the summit of Arsia Mons to test a gas-core nuclear engine—almost all the radioactive gas would escape from Mars—and they are willing to follow all of the rules and we trust them, we’d lease to them as well. The point, Brian, is that Mars doesn’t belong to any one country; it belongs to the Marsians, and the Marsians include everyone.”

“That’s a fantasy, Will.”

“No, it’s already reality; you’ve lived on Mars long enough to know that.” Will stepped into the elevator, which was waiting, and pushed the button for his floor. Brian Stark walked away.

## Outbreak

late Feb. 2059

By the next day the *Arcturus* had its zero-gravity gym set up. It was busy almost constantly with one game or another. Everyone fell into their routines. For most, that meant classes; the six-month flight was set up with two compressed terms of 10 weeks each. The twenty-four returning crew were busy offering geology, physics, chemistry, biology, and meteorology courses; courses on Phobos, Deimos, and various asteroids; and several dozen courses on safety, emergency procedures, and technology. The top of the ship around the gym was often occupied by space suited groups practicing various tasks. Almost everyone was taking two courses per term, in addition to their tasks keeping the ships clean and running smoothly.

Will Elliott had no single course for which he was responsible, but he was scheduled to give classes in quite a few; so much so that he was busier teaching than if he had run a course himself. On top of that, and his chef duties on Saturdays, he was busy as Commissioner. The first two weeks after leaving Earth the time delay for communications was minimal—less than half a minute—so he focused his energy on completing media interviews and following up conversations with governmental leaders. The result was a consolidation of the public relations gains and a firming up of the financial commitments. He sat with Brian Stark to clear up the confusion. When the Chinese launched two vehicles to Mars with twenty personnel on board, Stark and the American government were not shocked.

Will also turned to his heads of staff on Mars. They had not heard from him much for almost two months; he now began to call everyone to catch up.

“We’ll be ready with housing and work space for the flood of immigrants you’ve negotiated,” Alexandra Lescov, head of construction, assured him in her videomail. “In the last five years we’ve greatly improved our efficiency at enclosing land. Lisa Kok wants to increase the polder per person from 100 square meters to 120 to allow greater ecological diversity. Assuming the next fifteen years sees an immigration of 12,000 people, that means enclosing 1.44 million square meters of land—almost one and a half square kilometers—as opposed to 1.2 million square meters. We can do it without the private sector. Same with providing a million square meters of floor space for housing and work space. We’ll be ready, Will. Bye.”

Will hit reply. “Thanks, Alexandra, for the report. I want to be fair and frank, since that’s the only way videomessages work for communication over a hundred million kilometers. Alexandra, we have to expand the private sphere. I know you love running the construction corps and that we’ve become much more efficient because of competition from the Nigerians, the Green World Community, even the Zen monastery. But after I get back and all the immigrants arrive on Mars safely I plan to appoint a cabinet-level privatization officer. It’s the only way we’ll expand Mars, in the long run. I know you don’t like the idea, and I don’t blame you. Your operation is remarkably effective. But keep in mind the direction the wind is blowing, Alexandra. I’m sure we’ll have a lot more to say about this later. Bye.”

He listened to Yevgeny Lescov’s message next. The director of exports summarized their plans: four boroughs were all doubling their populations with an aim of

increasing gold recovery fifty percent from the ever-less-rich deposits that remained; Aurorae was increasing platinum group metal exportation fifty percent; Cassini, their oldest gold mining borough, was beginning a platinum extraction effort; Phobos was increasing its food exports to the moon and low earth orbit from a hundred kilograms to ten tonnes; exports of water, ammonia, and methane to earth orbit and the moon were doubling. Everything was on schedule.

It was quite encouraging. But Will had some new ideas. “Yevgeny, if there’s one thing I’ve learned on this trip, it’s the importance of expanding the export of platinum group metals. We all knew that demand was being driven by the skyrocketing price of petroleum. Just yesterday Khaliestan closed its borders in response to pressure from the United States and Europe—no people or goods in or out, except for some petroleum exports—and the implied threat to the oil supply caused the price of crude to shoot up to 247 redbacks per barrel. Gasoline now costs an insane price in the U.S and an impossible price in Europe. But what I learned from my visit is that the price of platinum is also being driven upward by fear. The nuclear bombs exploding in Paris and over Houston, the computer virus attack on the United States, and smaller incidents that happen weekly and sometimes daily have made everyone feel immensely insecure. People want solar panels on the roofs of their houses, rather than rely on the electrical grid. They want to be able to power their own car in an emergency. So the demand for fuel cells has shot up faster than anyone could have imagined. The bottleneck, of course, is the platinum catalysts and the steep price increase in them. This has pushed the development of better batteries and the conversion of hydrogen to methane so that it can be used directly in

internal combustion engines. As a result, fuel cells are not spreading as fast as they could even if they are more efficient.

“Platinum catalyst can be recycled, so supply eventually will catch up with demand. The price won’t stay up forever; about a decade, then it will drop. At that point, the moon and Mars should have captured the platinum group metals market. If we don’t expand, the moon will get a larger share. Mercury is going into the market as well. They’ll use solar sailers to get the stuff to Earth cheaply.

“So Yevgeny, we need a plan to increase our platinum exports fifty fold in a decade. Yes, I’m talking about a massive increase. It’ll take a lot of personnel, but we’ll have plenty immigrating over the next few columbiads. Divert a group of our best planners to this problem. I’ll copy Alexandra as well; she’ll have to figure out how we’ll make the solar and wind farms to produce the millions of kilowatts of electricity the effort will require, and what we can do with the millions of tonnes of nickel-steel that will be generated as a waste product. I’m copying Ethel as well. Let’s talk about this issue again in a week. Bye.”

Will send the message, copied it to Alexandra and Ethel, and added a copy to Érico Lopes, Chief Minister of the Mars Authority and to Ruhullah Islami, Chief Clerk of Aurorae Borough. He turned to a message from Lisa Kok, Director of the Department of the Environment. It was a routine summary of expansion of polder area for agriculture and bioarchive. Will agreed with her that Phobos needed new, larger cylinders for producing food for export. Then he turned to a new video message from Ruhullah that had just popped into his inbox. “Good sol, Will. I was about to compose my weekly report to you when your message to Yevgeny arrived. I was struck by your comment

about fear. Americans and Europeans are now beginning to experience a life that billions of people elsewhere on Earth have experienced for decades. I think back at all the trouble we've had in Iran for the last century and how it's continuing. Iranians can't switch to solar panels because they can't afford them.

“Your comment about Khaliestan prompted me to go to the web. I don't understand what those people are doing. The argument that Khaliestan is on the Arabian peninsula and therefore is part of holy land where foreigners should be excluded is rejected by even the Saudis. And it doesn't explain why they would close their borders to their own people arriving and leaving. The media quoted several Khaliestani mullas justifying the action, but the media should be going to Islamic websites instead; the mainstream mullas and experts all find the ruling absolutely bizarre. The Sultani sect that arose there and has taken over the country has interpretations rejected by almost all Muslims. There are some ideas that resemble Wahhabism, others that resemble the Taliban, but a lot is *innovation*; and I suppose you know that *innovation* is not considered a good thing by conservative Muslims!

“I wish the Khaliestanis could understand what an Islamic revolution means to a country. They should visit Iran. Our revolution was very exciting for a while, it was a source of hope around the Islamic world, but then it became mired in vast corruption and was kept in power by a draconian secret police. Overthrowing the revolutionary government caused terrible destruction and suffering, and our so-called secular society—we have even legalized Bahaism, much to the benefit of your coreligionists—is not much more stable or prosperous, since it is constantly threatened by terrorism. Khaliestan is being run by a determined minority of about a quarter of the population who will resort to

terrorism if the country is torn from their grip. I don't know what the west can do; the Sultanis will blow up their oil fields if they're attacked.

“Anyway, excuse this long diversion. You know how much I love Islam—I was named for Ruhullah Khomeini and I admire him still, in spite of some of his extreme actions—and I hate it when Islam gets hijacked. I know you hate it too.

“There's really not much new to report. We're bracing ourselves for the first arrivals in a few weeks and training them in the use of Martian pressure suits and emergency procedures. We'll start looking at ways to rearrange human resources and boost solar power production so that we can increase platinum output. I'll also send out some feelers here to some of our economists about increasing privatization. Bye.”

Will had to smile; Ruhullah was very diligent at carrying out the Commission's directives. He was curious what Ruhullah had seen about Khaliestan and ran to the *New York Times* website. Khaliestan had indeed closed their borders entirely; they weren't even letting their own people back in. He skimmed the headlines. New York City was seeing an unusual flurry of flu cases, with a lot of people being admitted into the hospital.

Meanwhile, Yevgeny had sent a reply, so Will listened to it. Yevgeny's face looked red; he was upset.

“Will, I know how important exports are to our overall balance of payments and our eventual financial self sufficiency, but we need to consider this proposal carefully. A production of 1,000 tonnes per columbiad requires the processing of about thirty to forty million tonnes of nickel-iron meteorite, or fifty thousand tonnes per sol! We'll produce about forty million tonnes of largely unusable meteoritic nickel-iron every columbiad. We'll need thirty megawatt-hours of electricity per sol, a continuous power output of

250,000 kilowatts, a solar array of about a quarter of a square kilometer. . . . we'd need fifty times the equipment we have now and a work force of 500 to 700 people. This is a massive project! And if demand were to sag we might have to lay off a lot of them."

Will ran to a website to get some information, then hit reply. "Yevgeny, I know it's massive. But that's no reason not to do this. That same thousand tonnes of platinum produced on Earth generates 250 million tonnes of completely useless waste rock, 6.4 million tonnes of carbon dioxide exhausted into the atmosphere, 1.25 million kilowatts of power, and the operation employs thousands. We can do it more cheaply than Earth and spare the Earth's environment. A thousand tonnes of platinum group metals at the current price is fifty billion redbacks! Maybe asteroid mining would be a serious competitor because they could export the nickel-iron to earth as well, but so far no one is willing to invest tens of billions on asteroid mining and settlement. Besides, if someone did that we could offer them Quirinus. If we had to shut down part of the operation, we'd divert the power production into other things, like making greenhouse gasses.

"So think big. If we're going to have twelve thousand people on Mars in fifteen years, why shouldn't 700 of them be extracting platinum group metals? Bye."

Will sent the message. He was reading an email from Pete Theodoulos when there was a knock on his door. "Come in," he called.

The door opened and Brian Stark stood outside. "Come on in, Brian. How are you this sol?"

"Pretty good, Will." Brian closed the door behind him and walked over to the extra chair. Will turned his chair around to face his guest.

"What's new?"

“We’ve missed you in the zero-gee volleyball tournament that had started.”

“I’m going crazy planning all these classes I have to teach, plus wrapping up the work on Earth and charting its implications for the future. We’re going to need a lot more electricity. We have to expand our platinum group metals production.”

“My trip probably strengthened funding for plutonium and uranium production, partly because of your unexpected support of Chinese competition. The Chinese will probably start work on gaseous core nuclear engines, so we’re determined to get ours functioning sooner, and that means a larger production of plutonium. We’re even negotiating with the Russians for joint funding, because they have some top notch scientists.”

“I heard a rumor from someone in Paris that the European Space Agency is talking to the Chinese about joint funding for space nuclear research.”

“I’ve heard that rumor, too. We’ll have some unusual alliances. At least the result will be good for space exploration.”

“Yes, it sounds like Jupiter and Saturn will open up in the next decade.”

“Will, did you make any kind of agreement with the Chinese to fuel their Jupiter spacecraft?” Brian was surprisingly blunt.

“Brian, Mars is free to sell its hydrogen to anyone anywhere. But no, we don’t have a contract.”

“A clever hedge. Look, I came here to apologize for being so rough on you last week. I went back and looked over the agreement and I see you are right. But please understand that the folks in Washington thought they had an understanding with a fellow

U.S. citizen that he would keep the interests of America close to his heart. We didn't see that in your subsequent actions and felt betrayed."

"Thinking about our conversations, I realized that was what had happened. But please don't think I was being dishonest or misleading. After twenty-three years on Mars, I think like a Martian."

"I understand, and you even said as much in Washington. I know Mars and the U.S. will not always see their interests coincide. I've tried to explain that to my colleagues since."

"Thank you for that. No, they won't be the same, and I am bound by duty to give Martian interests preference over American interests. China and India both graduate more scientists and engineers per year than the United States does. All countries willing to play fairly by the same rules should get equal treatment. Fortunately, in this case the Board of National Trustees agreed with me; the United States and China both voted in favor of the other's lease."

"Yes, that's true. Of course, we thought we would have two years on Deimos without the Chinese. Now it turns out they're launching their own vehicle to Mars tomorrow."

"So I hear. I don't think the United States would have the capacity to prepare a Mars mission on four weeks notice."

"No, probably not. All I can say, Will, is be careful and watch them carefully. If they take advantage of the Mars Commission, my people in Washington will be merciless."

“I know. Of course, half of Mars is telling me to keep an eye on you pretty carefully as well.”

“I understand that, but we’re committed to play by the rules. Washington doesn’t like the situation, but it’ll adapt. You were right when we spoke last week; having some rudimentary information of the other team’s accomplishments is probably good.”

“And having both teams doing their nuclear research on Mars is good for everyone. I think it’ll work out fine for the U.S., China, and Mars.”

“I hope so.” Brian rose from his chair. “We’ve got a volleyball game this afternoon, so come play. Let all these new Marsians see what their Commissioner can do.”

“Okay, I’ll be there.”

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The next sol saw Will working in his room, like the other sols. He paused in the reading of emails before his 2 p.m. appointment to scan the news. He was startled to see a news flash that over one thousand people had now gone to the hospital in New York City with symptoms of a very serious flu-like illness, and that three people had already died. Boston, Chicago, and Seattle reported a flurry of hospitalizations as well. Clearly, something was happening, but no one was sure what.

Worried, he kept reading. He was about to call Marshall when there was a knock on his door. His 2 p.m. appointment was exactly on time.

“Come in.”

The door opened and Dr. Tang Enlai strode in. Will smiled and rose. “How are you today?”

“Oh, very well, and you?”

“Just fine, but I was reading about the flu spreading in New York. It sounds like a very dangerous strain has suddenly emerged.”

“Yes, and in New York of all places. Usually these things emerge somewhere in Asia; China, in fact.”

“Well, we can’t blame you for this one. I gather you had quite a triumphant world tour yourself?”

“Yes, I was about three days behind you!” replied Enlai. “The number of universities that wanted me to speak about Martian life was mind-boggling. But I got a pretty hefty speaker’s fee and met a lot of areobiologists, exobiologists, and eobiologists. There’s some incredibly good work being done.”

“And now the study of life inside Europa has begun.”

“Yes, very exciting! I wish I were going to the Galileans. I have put in for a slot on a Chinese mission to Jupiter, as long as I can come back to Mars afterward. The plans to reach the ocean inside Ganymede are advancing and eventually people will try to reach the ocean inside Callisto as well. Three worlds, and they probably all have life; possibly different types, too!”

“It’s very exciting. Congratulations on the successful launch.”

“Thanks. I called the crew an hour ago. The trans-Mars injection went quite well. They’ll reach Mars two months after us.”

“Pete Theodoulos told me. He’s arranging two shuttles to take them down to the surface. That’s something I wanted to talk to you about. Dawes has a spaceport and Cassini will soon get one, though it isn’t convenient for flights to Deimos. I suggest we

put the Chinese nuclear reservation at one of them and not at Aurorae. Two large nuclear reservations would tie up a lot of land around Aurorae and possibly limit the borough's future growth. Dawes will have over one hundred people after our arrival, so it's not tiny. It's probably wise to separate the American and Chinese reservations anyway. Furthermore, I am pushing for a major expansion of production of platinum-group metals."

"And you need electricity."

"Exactly. We don't want to pay an exorbitant price for it, either. But a major expansion of platinum production will take lots of power. Let the Americans provide it to Aurorae and the Chinese to Dawes."

Enlai nodded. "Cassini now has a university complex to help it grow. Dawes could use more traffic for its spaceport. The two boroughs are how far apart?"

"Two thousand kilometers. Meridiani is about the same distance. They're too far for an electrical connection. But if these boroughs expand—and all of them want to go into platinum extraction—they'll need power. We favor a baseline nuclear system equal to one third to one half of demand to guarantee plenty of power during dust storms, with solar and wind providing the rest. But we have to have the power at a reasonable price, which we're defining as 600 million redbacks for ten megawatts of baseline capacity."

"That's not much; imported reactors are pretty expensive. Such a cost per megawatt is possible for larger reactors, though. I'll have to pass this information on to Beijing. I doubt they'll be interested at that price. But we can always sell surplus power produced by a plutonium breeder to Aurorae, Dawes, or Cassini at a reasonable price, since the purpose of the reactor is to make plutonium, not power."

“We’re counting on that. We had wanted two to five megawatt reactors, but if we increase production of platinum group metals we need reactors in the ten to fifty megawatt range.”

“The latter is getting up to the size a breeder needs.”

“Exactly.”

“Okay.” Enlai nodded. “I’ll pass all this information back to Beijing. It feels funny to be in the position of a national representative.”

“Until the nuclear team can arrive, I’m glad you can fill the role.”

“I’m glad to do it, too.”

Will and Enlai chatted for a few more minutes, then the latter left. Will turned back to his videomail, sending Marshall a quick message asking how MIT was going. He had just moved into the dormitory a few days earlier. But there was no immediate reply.

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When Robert Kampala entered the cafeteria, he looked around for Sarah Pannakar. Over the last few days they had eaten lunch together, which had been very pleasant. She was already in line, so he hurried over and grabbed a tray. By the time he was through the line she had already found a table for the two of them.

“How are you today?” he asked.

“Oh, pretty good,” she replied. “The class on zero gravity medicine I’m taking was totally absorbed by the news.”

“Which news?”

“Haven’t you heard? Two hours ago it was announced that the influenza outbreak in New York City appears to have been intentionally started by a terrorist group. There

are now 3,000 people who have gone to hospital because of severe symptoms; over one hundred have died. At this rate in two or three days the hospital system will be completely filled to capacity.”

“What?” Robert looked extremely shocked. “Who would do such a thing?”

“Good question. No one knows yet. No group has claimed responsibility. The authorities have been asking everyone where they’ve been and who they’ve been in contact with, and it appears all these people have been in one of two places: Grand Central Station or the domestic terminal of Kennedy International Airport. They now theorize someone intentionally spread the influenza virus at those two locations somehow.”

“My God!” exclaimed Robert. “At least there’s a vaccine against the flu.”

Sarah shook her head. “This strain is different; the vaccine won’t work against it. It’ll be months before a large quantity of vaccine can be manufactured. Meanwhile, there appear to be smaller outbreaks in six cities already, and since the incubation period is about six or seven days they estimate that there will be dozens of cities affected. There may even be a small outbreak in Helsinki, Finland!”

“What will they do? It’s a good thing we left Earth when we did.”

“Yes. They’ll have to quarantine everyone who’s sick and stop travel too and from infected places.”

“That’ll disrupt air travel!”

“Totally. The class devoted the entire period to the implications. If we were still on Earth right now, all launches would have been scrubbed and the *Polaris* would be

returning to Mars empty. We don't want this loose on Mars. People there are exposed to fewer germs and thus have less immunity."

"What would a pandemic do on Mars?"

"Don't even ask." Sarah shook her head. "It would be a terrible disaster."

"How many would die?"

She shivered. "Oh, Robert, don't even think a question like that." She paused to stare at him. "No one knows, of course. We still don't know the mortality rate on Earth, either."

"That's true." He ate more of his lunch. "How is public health set up on Mars, anyway?"

"About the same as anywhere else. Mariner Hospital in Aurorae has a dozen physicians and all the advanced equipment you'd find anywhere on Earth. The other boroughs have clinics; most of them have one physician. If anyone gets seriously ill, they're flown to Mariner."

"Does the hospital have an infectious disease specialist?"

"Yes, an epidemiologist, but the Martian health service relies heavily on specialists on Earth; the physicians are trained to be good at observation and asking questions and at carrying out a wide range of procedures after getting advice from Earth." She looked at him closely. "Don't worry, we're pretty safe on Mars."

"Safe?" he snorted. "With all that radiation and the resulting cancer, the airborne dust, the interior contaminations—"

"Yes, safe. The cancer rate isn't significantly higher. It's actually very hard to compare because of the intense level of medical treatment on Mars. Take a woman who

develops a small, benign growth at age 43 that becomes cancerous at age 55. On Earth, it's found when she's 56, classified as cancer, removed, and eliminated through chemotherapy; on Mars, it's found when she's 45, removed through needle aspiration, and classified as a precancerous growth. People have dozens of precancerous growths and only a few of them become cancers. So on Mars we suffer from five times as many medical tests, three times the level of biopsies, and twice as many removals of minor growths as on Earth, but our death rate from cancer is lower than on Earth. Of course, there are statistical models we can use to compare the populations—" She stopped; he wasn't listening. "Don't you know this already?"

"No."

"Why not? It's in our study materials in several places, and I think I've heard it three times in mandatory orientation classes."

He shrugged and reached down to pick up her purse. He tackled a stuck zipper, twisting the track around and bending a few teeth back into place. Then he handed it to her.

"Wow! Thanks!"

"That's been bothering me for a week. I can't help you with the tear in the rear pocket of your pants, though. I'm not here for classes, Sarah. I'm here to fix things."

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Will was glued to the television when he wasn't handling messages. The spreading influenza pandemic saturated all the media all the time. Normally he wasn't addicted to news, but there hadn't been news like this before.

His attaché beeped and an icon flashed with an incoming message. Will pushed play and the BBC shrank to a little silent picture at the bottom of the screen.

“Hi Will,” said Louisa Turner. “I thought I’d better let you know that my flight to Houston has been canceled. Of course, Houston doesn’t have any infections, but no one wants to fly to the States right now and the U.S. doesn’t want a lot of people moving around anyway. I’ll stay in my apartment here in Paris until the scare ends; well, if it ends any time soon. So far there are no reported cases in France, but there are thousands of people here who have been in one of the infected cities and they’re not all admitting who they are. The authorities suspect it’s a matter of time before cases are reported here because the thousands of possibly infected ones have been in contact with hundreds of thousands of people already. The highways are jammed; half the population of Paris has decided it is safer to head for the countryside where there are fewer people. And some of them are probably spreading the infection. The Mars Commission offices were pretty quiet this afternoon; I suspect by tomorrow most people will be working from home. The authorities are talking about closing the public schools and several companies have closed factories. This is going to disrupt our operations seriously, not to mention the gross domestic product. Pierre and I are meeting in half an hour to talk about implications. I suspect the panic that the public feels here in Paris is pretty typical in other cities around the world. Bye.”

Will immediately hit reply. “Louisa, this is the kind of event that spreads a thousand times as much fear as actual harm. Only seventy-five people have died in New York. No, I guess it’s ninety-one now. The virus probably has a ten percent mortality rate. But New York City is completely shut down, half of the U.S. is shut down, and now

the world is shutting down. Keep yourself safe; that's very important. But maybe I should say something about this event to our people to calm them. It might even help to calm the general public. What do you think? Bye.”

He sent the message and put the BBC back on his screen. The BBC story was already winding down and he remembered that he hadn't heard from Marshall in twenty-four hours, so he taped another quick message to his son. Then Louisa's reply arrived; the round trip time delay to Earth was a bit under a minute.

“Maybe there is something you can say, Will. I'll work on the talking points. You jot some down as well and send them to me. The problem is that you are removed from the danger, a few million kilometers from Earth, so your credibility can be assaulted; and there are plenty of people who are raising their television ratings and thereby making money by amplifying the fear, so they'll be glad to attack you. Consequently, we have to craft your statement very carefully. Bye.”

He had thought of that, and it grieved him that he couldn't just *help*. But the world had gotten too complicated for simple efforts. He jotted down some points, edited them, added a few more, then renumbered them. It was often helpful for Louisa to work on a statement separately from him, and then bring the two efforts together. Sometimes the best of both could be used and other times one statement had to be abandoned in favor of the other. More rarely, versions of both had different uses.

He was about to put his outline into an email and send it to Louisa when the “urgent message” icon began to flash on his screen. It was from Molly, so he activated the message immediately. Her face looked immensely worried.

“Hi, Will. I just got a call from Cambridge. Marshall was admitted to Mount Auburn Hospital in Cambridge about an hour ago because of the flu. His fever was spiking uncontrollably high; it’s so high they’re doing emergency cooling of his body. He’s unconscious. He had gone to the infirmary on campus last night and they had given him medicine. They had to send him to the hospital in an ambulance with a doctor on board. I don’t have a videomail or voice mail to send you, and the idiots refuse to give out the email addresses of any of the physicians or nurses on duty, so there’s no way you can contact them. I’m still trying to get you an email contact so you can send them videomessages and they can get back to you. I suppose I shouldn’t call them idiots; they’re not used to communications with people off Earth. I’ll let you know when I have anything else. Bye.”

Will felt a deep chill settle into his body. Not Marshall! He closed his eyes and said a prayer; he didn’t know what else to do. He felt paralyzed for a minute about the situation. Finally, he hit reply. “Molly, call the chaplain’s office at the hospital. They’ll have email and they’ll understand. They’ll probably straighten out the mess. God, this is unbelievable. It’s so terrible. . . I wish he had never wanted to go to Earth. I’ll be saying prayers up here, Molly. Get me more information when you can. Bye.”

He sent the message and closed his eyes, uncertain what to do. Ethel had to know. He turned to his attaché, forwarded Molly’s message to her, and added a message of his own: “Hi, hon. Sit down before you listen to the attached message from Molly. Marshall’s at Mount Auburn Hospital in Cambridge with the flu. I’ll let you know what else I find out. I love you. . . bye.” His voice choked at that point. He sent the message.

He stood and paced his room. He closed his eyes after the first few paces; he didn't need to see where he was going and didn't mind if he ran into a wall. The blackness he could see through his closed eyelids reflected the emptiness he felt. No, not Marshall. Not Marshall.

He sat and said a prayer from memory. That seemed to help. Then there was a beep from the attaché; incoming message. He looked at the address; it was Louisa with her talking points.

There was no need to look at them. He glanced at the file that was still open on his attaché. The talking points stressed staying calm, keeping oneself safe, and focusing on the goals, and making sure one did not have fear for the sake of fear. Some no longer felt right, but others were a good reminder to him as well. He hit reply to Louisa's email and activated the audio recording feature. "Louisa, I'll look at your points later. I just heard that Marshall has the flu and it's so serious he's in intensive care. I'll get back to you. Bye."

He sent the message, then looked at the screen again. He had to pull himself together and rewrite his speech, now with some passion behind it. But his mind was a creative blank. So he sat and stared.

Another beep and another message. It was Molly. "Taraz is on his way to Cambridge and mom is organizing the world's biggest prayer chain by telephone and email. I called the hospital chaplain's office and got a message apologizing that in the current situation they would have to reply when they could. Then the doctor called to say they had Marshall in the last available room in intensive care and that his fever was under control now. He's not out of the woods, but he is not in immediate danger.

“By the way, I started recording the doctor’s message to me and when he noticed he insisted that I erase it immediately. I explained that you were a light-minute from Earth and had to receive things by email attachment and he replied that the terms of his malpractice insurance, and hospital policy, did not allow him to put his observations into recorded form! I replied that since that policy was no doubt the result of a lawsuit, perhaps we should sue about the policy. He said I should talk to the hospital attorney. It made him immensely nervous, so I apologized and emphasized I was joking.

“You’ve got Taraz’s number, so message him in about three hours, or wait and I’m sure he’ll message you. I’ve got to get on the web and find a hotel room for Taraz; talk to you later. Bye.”

Will forwarded the message to Ethel with a short message expressing relief. He turned back to his attaché. Now he could concentrate. His hand shaking slightly, he began to rewrite the talking points, keeping an eye on the icon box for another message from Earth.

## Tie Your Camel

March 2059

Classes on the *Arcturus* had to be canceled the next sol. No one could concentrate on them. Almost everyone knew someone who knew someone who was sick. Everyone had to talk to family and help them make decisions; whether to leave the city for a rural location, where the chance of catching something was less but the chance of dying might be greater; how to handle the problems caused by a partial shutdown of society, including reduced deliveries of everything and the dangers of going out to shop. The world's televisions screens showed a stream of dreadful news. Hospitals were soon completely full, with emergency rooms overwhelmed. Those who arrived first, like Marshall, were the lucky ones; there were facilities and personnel available to treat them, and the fatality rate in consequence was under ten percent. But those who arrived after the rooms and then the corridors were full suffered far more seriously, with fatality rates exceeding thirty percent. Everyone with any health care experience was expected to help, with or without pay.

Worse problems than the overcrowded hospitals were rapidly spreading, though. Everyone wanted to stay at home, which meant that transportation of goods was collapsing and shortages of everything was looming. That triggered hoarding, runs on grocery stores, and runs on banks. That triggered fights and even riots, which escalated into looting in poor neighborhoods. The riots destroyed crucial infrastructure that could not be easily repaired with many repairmen staying at home. Every major city in the United States had to declare martial law.

Will was watching the news when there was a knock on his door. Enlai Tang was standing in the doorway. "Come in, Enlai."

"What's the latest news?"

"Oh, nothing." Will pointed to the screen. "It's just Mulla Muhammad blessing flu vaccine."

"More?" Enlai looked at the screen briefly to watch the bearded spiritual leader of Khaliestan walking through a pharmaceutical plant, waving his prayer beads at endless rows of vials and repeating a Koranic verse. Then Enlai shook his head. "I cannot imagine the superstition, ignorance. . . the foolishness of these people, to think that the wave of a holy man will protect them from the flu."

" 'Trust in God and tie your camel,' " replied Will. "There's a story Ruhullah told me about the Prophet Muhammad. He had preached to the Meccans frequently about the supreme importance of submitting oneself to God, trusting wholly in God, leaving all one's affairs in the hands of God, etc. So one day some Arabs rode into Mecca and sought out Muhammad. One said to Him 'O Prophet, I understand that you have called on the people to trust God in all their efforts. So, does that mean when I come to town, I shouldn't tie up my camel, but trust in God to watch over her?' And Muhammad replied 'trust in God and tie your camel.' So Muslims are not just blind fools who follow leaders; they are called on to be practical. But you know, Enlai, in this case they can't tie their camels. There is no vaccine for this strain, and there won't be for months. When there is, I doubt Khaliestan will be high on anyone's customer list. So in this case, all they can do is trust in God."

Enlai scowled. “Will, I appreciate your effort to explain these people, but surely your explanation is inadequate. First, it’s scientifically inadequate: we’re talking about worthless vaccine that’s being injected into people. Second, it’s ethically inadequate: the manufacturer, a European company who just happened to have a plant in Khaliestan, is making a fortune because tens of millions of Muslims want to buy a useless vaccine *now*, so they have doubled their selling price. And if I weren’t such an atheist, I am sure I could argue it is religiously inadequate as well.”

“I am not claiming the explanation is adequate; just that it is an explanation! I can give a perfectly good religious reason why it is inadequate, also: God may listen to and honor the wishes of humble and holy persons, but I doubt he honors the wishes of a megalomaniac such as Mulla Muhammad, and I fear he is a megalomaniac. Furthermore, in this case it sounds like the European pharmaceutical company is tying its camel at the expense of the Muslim world. But Enlai, the entire world is in a panic right now, and people do irrational things when they panic. Some of the irrational acts are atheistic and some are religious. Consider the mess that the so-called ‘Army of the Lord’ is wreaking in northern Idaho right now.”

“It sounds like the governor’s calling out the National Guard.”

“He has to; the ‘Army’ burned a Catholic Church and murdered the old priest that ran the parish. So much for establishing a beachhead so that Jesus has a safe place to land when He returns on a cloud. That group was triggered by the flu panic as well.”

“And the suicide pact in Venezuela a few days ago. I know. It seems like all of human civilization is threatened right now. Which is why I am here. The Chinese space agency and various government officials have been busy in spite of the flu. They’re all

sequestered at ‘undisclosed locations,’ drinking beer and sending emails to each other and to me. We’re willing to locate our nuclear reservation at Dawes; we think it’s a good idea to be far from the Americans, even though the place is a bit small. It has its own spaceport. But we wonder whether the Mars Commission still wants a lot of power to recover a lot of platinum. This pandemic will mess up the economy for years.”

“For decades I suspect. They say the infection rate may already have peaked in New York City because of the swift response by public health officials, but it will continue to smolder for many months, and I bet there will be new outbreaks of this flu virus strain for years. But we see no reason to change our plans. The price of oil is dropping fast on the futures market because demand is projected to drop thirty percent in the next few months. Khaliestan’s revolution has been stripped of its leverage on the world petroleum market. But the terrestrial economy will recover in two or three years and the demand for energy can only increase long term, whereas the availability of petroleum can only continue to decrease. The move toward solar and wind power, biogenic fuels, and fuel cells is inexorable. If anything, this disaster works in our favor, because it gives us the time to expand production.”

“Hum. You are making some rather optimistic assumptions, I think. They’re now guessing a worldwide death of sixty million people.”

“I know. In other words, about equal to the impact of AIDS. About one half percent of the world population. In itself, that won’t shrink the world economy much; panic and fear are the problems. No one is going anywhere; major airlines face bankruptcy; transportation of goods has been hit hard; there are shortages; no one is buying anything beyond necessities; layoffs inevitably will follow. If the terrorists are

ever identified there will probably be a war as well. But no one is predicting a long-term collapse of the global economy or of any major currency. The situation is severely impacting the Mars Commission's terrestrial operations and causing terrible suffering among its employees. It has halted tourism to the moon and to low earth orbit and will probably cut lunar tourism by half, hurting our colleagues there. But it isn't undermining the markets for gold or platinum-group metals, so it probably doesn't change our strategies in them."

"The price of gold has been climbing steeply," agreed Enlai. "Alright, I'll inform my government."

"Have you any idea whether China will be able to pay for the promised increase in arrivals next columbiad?"

"I think everyone is assuming we will postpone our commitment by a columbiad. We'll have to if the flu pandemic proves to be as tenacious as appears likely. Oh, and let me add something private. When I was in Beijing I spoke to quite a few space agency officials, and at the time they encouraged me to apply for the first Jupiter mission. I just heard that I've been approved for it." He was smiling broadly.

"Hey, congratulations! It makes sense. You are one of two or three distinguished exobiologists in the world, and the only one to have daily access to new fossils, infinite supplies of sedimentary rock for new biochemical tests, and immediate access to new sites. There are oceans under Europa, Ganymede, and Callisto, and we know the European ocean has biology."

"Yes, the telerobotic rovers have found vast amounts of fossil organics on the surface. The unpublished preliminary analysis of surface samples on Ganymede show the

same thing; I've been peer reviewing the manuscripts. It's a shame Callisto hasn't had extensive openings in its ice crust."

"I'm sure vents will be found, Enlai, and you'll be there to check them out personally. I'm delighted for you. Do you know when you'll be going?"

"I know the tentative launch date, but I can't tell you. We'll see how the Jupiter 1 test flight to Mars and to the asteroid Metis goes in a few years."

"Yes, of course. I suppose we'll have to find a new president of the university."

"Definitely. I'll plan to resign next year or the year after. I'll have been president fifteen years, which is a long time; it'll be someone else's turn by then."

"We'll miss you on the Mars Council. By the way, did you ever get any complaints in Beijing about your election to the Council and your duties on its behalf during this trip?"

"You know, it was interesting. They were furious when I was elected; they were afraid I would use the position to press for democratic reforms in China. But I didn't and remained a loyal citizen. When I told them I had to spend two weeks touring Earth to give talks on Martian biology, they had no problem, and I worked my official duties for the Council and the Mars Authority into the schedule. When I returned to Beijing they treated me like a VIP and expressed pride that China had someone elected to the Mars Authority's legislative body! So it worked out much better than I thought."

"Good, I'm relieved. I'm curious, what was your impression of Earth?"

"Earth? I had been away fifteen years. Beijing was unrecognizable, so much had changed. My grandparents' houses were both gone, replaced by skyscrapers. China has made incredible progress, and the steady spread of elections at the local level had

produced quite a change in the populous. Corruption was the big problem I saw; it has increased quite a lot. Europe and especially the States were filled with more glittery buildings than ever, but the people seemed less polite and they felt less safe.”

“That’s true. I see I have a new videomail; I had better get back to my work.”

“Of course. See you later, Will.” Enlai turned and headed out the door. Will glanced at the message and saw, much to his surprise, that Marshall had sent it. He hit play.

Marshall was in a car; snowy suburbs were going by behind him. His nose was red and he looked tired. “Hi dad. As you can see, they’ve discharged me from the hospital, not because I’m well, but because there are so many sicker people who need the bed. So they hurried me out, but not before giving me a copy of the \$100,000 bill for four days of stay in the hospital that I guess my insurance will pay, assuming insurance companies don’t go bankrupt from the strain. They said I’m on the mend, though I don’t feel very much better. Uncle Taraz is driving me to Connecticut. I think he’s getting sick. We don’t have enough fuel to get there and who knows whether any filling stations will be open, but he has a friend outside Hartford who can fill us up, so we’re heading there. I’ll stay in Stamford for a few weeks at least because M.I.T. is closing down until the pandemic wanes. Bye.”

What a relief. Marshall looked haggard and weak, but his personality came through in his voice. Will hit reply. “Thanks for calling. What a relief you are doing better. Take care of yourself, get a lot of sleep, and rest. Let me know when and where you stop and when you get home, okay? And take care of Taraz if he’s getting sick. I wish I could turn this ship around and go back to help you. As you can imagine, most of

us are torn between escaping Earth and feeling guilty for it, and wishing we could help or just be with our loved ones there. I'm sorry to hear the university is closing. Hope it reopens soon. Call mom and let her know you're doing better. Bye.”

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Sarah Pannakar came out of her classroom and turned right to head down the corridor toward the stairs. She glanced to the left and thought she caught a glimpse of Robert Kampala sticking his head out of another classroom, then disappearing back into it. Strange.

She entered the stairs and hurried down two levels, feeling her weight grow with every step downward. The educational area was located near the hub where gravity was about a tenth of a gee; something people could easily handle a few hours, in fact it made sitting in chairs more comfortable, but it was a gravitational field no one should be in for more than a few hours a sol. It was slightly disconcerting to adjust one's reflexes to different levels of gravity—the way one walked was effected by the changing level of traction caused by higher or lower gravity, and one's forward momentum was the same regardless but one's ability to speed up or slow down was diminished in lower gravity—so Sarah made a conscious effort to slow down and be careful.

She stepped out of the stair well on the second level—one up from the outer rim of the spinning ship—and turned right toward her room. As she walked forward, she was surprised to see Robert coming toward her in the corridor.

“Good sol,” he said. “How are you?”

“Pretty good. I'm hurrying to my room right now; got to get ready for mass.”

“Mass? At this hour?”

“It’s a special mass for everyone who has loved ones on Earth, so they can pray for them. Why don’t you come along?”

“To mass? No thanks. How can there be a mass on board, there are no priests?”

“We’ve got two deacons on board. One’s giving the sermon and the other’s distributing communion; the hosts were consecrated on Earth.”

“I figured you were Hindu.”

“No, my family’s been Catholic for five or six generations! What’s your background?”

“Oh, I’m nothing; an atheist, in fact. I didn’t realize your room was on this level, so is mine.” He pointed.

“Really?” That was not surprising; half the people on board had their rooms on the second level. The rest were on the first level. The top three levels, which were smaller because they were closer to the hub, were lounges and classrooms or housed equipment.

“Yeah; right down here. Come, I’ll show you.”

She stared at him. “Say, Robert, didn’t I just see you outside my classroom a minute ago?”

“Huh? No, I’m walking back to my room from the cafeteria.”

“I see. Well, I’ve got to run.” She walked past him; he just stood in the corridor and watched her go. It made her distinctively uncomfortable. Come to think of it, she had possibly seen him following her, the sol before. He was a strange man.

She entered her room and made sure the door was closed tightly behind her. She quickly changed, then headed up the stairs to the cafeteria. It was filled with worshippers; she was amazed. There was barely room for her to sit, and subsequent arrivals had to

stand. She was not surprised to see Commissioner Will Elliott present; he tended to make appearances at public events of this sort. But Yuri Severin, Commander of the ship, was much less gregarious, and he was present as well.

They began with a hymn that not everyone sang, and fewer in tune, then listened to the Old and New Testament readings. Many people did not take communion, but when the time came to offer names of people to pray for, almost everyone mentioned someone who was sick. No wonder one third of the persons on board the two ships attended mass.

It was a fairly quick program; a bit less than an hour. As Sarah rose to leave, she spotted her friend Jacaranda Chamberlain, a media specialist. She walked over. “How are you doing?”

“Pretty well; you?”

“Fine. I’m amazed so many people attended.”

“Yes, it was a crowd, but most people feel frustrated and helpless, and praying gives them something to do.”

“Here we are, twenty-first century people, educated, and we’re praying for the cure of a disease.”

Jacaranda shrugged. “Well, no matter what century and what education, we’ll still be helpless before some things, won’t we?”

“That’s true; that’s life,” agreed Sarah. “Where are your parents?”

“Bridgeport, Connecticut, an area of high infection right now. So far, they’re alright, and they have health insurance, so they can afford to go to the hospital if they have to. You might have heard that many hospitals have started turning away people who have no health insurance because of the crowding, unless they can pay a deposit.”

“Yes, I heard there was a riot at one hospital in Detroit the other day as a result.”

“People aren’t very tolerant of being treated like profit centers when they might die.” Jacaranda sighed.

“Your country has to establish universal health insurance some time,” said Sarah. “It’s obscene that a third of your citizens have no coverage.”

“I know. What about you?”

“Oh, my parents are in India, and so far there’s only a little infection there. The flu tends to hit cold climates the hardest; people are indoors during the winter. But in our climate we tend to be outside a lot.”

“It’s funny that the terrorists, whoever they were, released the virus in February, rather than December or January when it is coldest.”

“Maybe they didn’t want to make the outbreak too severe,” replied Jacaranda.

“Though that doesn’t make sense, does it?”

“No. One of the mysteries that may be cleared up if they ever catch the perpetrators. Say, I’m planning to jog later; want to come along?”

“Sure, when?”

“At 11 p.m. when the outer perimeter can be used for jogging for an hour. How are your classes?”

“Pretty good. The space suit class will be taking an EVA in two days and I can’t wait.”

They began to walk toward the door. Then Will Elliott approached them.

“Jacaranda, I heard from Marshall just before the mass. Taraz is doing very, very poorly.

They can't take him to the hospital because it's turning people away, unless they're almost ready to die. It's not looking good at all."

"Really?" Jacaranda shook her head. "That's terrible. Taraz is a really special man."

"He really is," agreed Will. "I'm going to my room to say some prayers for him."

"I'll do the same tonight," said Jacaranda.

Will turned to walk away. As he was leaving the room, someone ran down the hall. "Hey, everyone, turn on the television! They just announced that Khaliestan was behind the New York flu!"

The room, which was still more than half full, broke into pandemonium, with everyone talking at once. Someone was near the controls of the big screen on the wall and activated the BBC. Everyone immediately sat in the nearest chair to watch.

"To recap, the President of the United States spoke from the Oval Office five minutes ago," exclaimed the news anchor. "He announced that American intelligence had intercepted a series of coded messages last month before the flu outbreak that were decoded only yesterday. These messages were between one individual who apparently was the plot leader, a shadowy figure named Zekaria Daoudi, and the government of Khaliestan. The Khaliestanis apparently developed the genetically engineered influenza virus in a secret facility in the desert and shipped it to the United States inside an overnight package to Daoudi. It is not yet known whether he worked alone or in concert with others. The release of the virus would not have required any assistance.

"Zek Daoudi is the subject of an intense manhunt. He is a Moroccan national who flew to the United States from Khaliestan in late January. His whereabouts is unknown.

“The President also announced that the flu vaccine, which Khaliestan has been producing for some time, may be designed to protect against this flu strain. Since the crisis began, Khaliestan has sold vaccine to almost fifty million people, mostly in Muslim countries, and it has inaugurated a massive domestic inoculation program. The vaccine was widely regarded as bogus medicine. The President has demanded an immediate accounting by Khaliestan.

“We now turn to our correspondent in Khaliestan, Jeanna Moore—”

“They tied their camel after all,” commented Will to no one in particular. He turned to Yuri Severin, seated nearby. “This is incredible.”

“If you want to start a world war between Islam and the rest of humanity, this would be an excellent way,” he replied.

“If the U.S. attacks Khaliestan, they’ll destroy their own petroleum facilities, which guarantees a petroleum supply collapse and worldwide depression.”

“You’re right. If this intelligence is right, it’s a clear effort to weaken the West, strengthen the Islamic world, and drive a wedge between them.”

“It can only lead to hatred and bloodshed,” agreed Will.

“There’s no way there’s enough vaccine in Khaliestan to help the West, either,” added Jacaranda, who was nearby. “The little they could obtain will just make the emotions higher.”

“It’s a perfect plot, from the point of view of turning people against each other,” said Will, shaking his head. “We have to be very careful up here that we don’t get drawn into the emotions.”

They listened to the BBC for a few minutes, then Will returned to his room. There was already a video mail.

“Will, this news deserves a statement to our terrestrial work force,” exclaimed Louisa. “Something expressing great sadness but calling for calm and unity. What do you think? Bye.”

He wasn’t going to do that yet; it was too soon. He called Brian Stark. Brian was in his quarters; Will could see the television behind him. “Hey Brian, what’s your take on this situation? It sounds like the possible start of a huge war.”

Stark looked worried. “The U.S. has to retaliate; this is a big attack. Otherwise the President won’t get reelected. I suppose I’d launch a raid to capture the vaccine lab; they know where it is. And no doubt the Khaliestanis have already packed up everything and hauled it to various secret locations. The next step would be to invade the country, just like the invasion of Iraq.”

“But the Khaliestanis really *will* blow up their oil fields,” said Will. “We know what a mess of terrorism and instability the Iraq invasion caused for over twenty years.”

“There are no solutions to this mess. Too many Muslims will maintain that the vaccine worked because of the mulla’s blessing and not because it was designed to do so, so they will see the American attack as motivated by greed, not defense.”

“I need your advice, Brian, to figure out how to steer Mars around the pitfalls. It’s probably safe to assume that the worldwide recession will become a lengthy major depression. Most of the money pledged for immigration won’t materialize. But millions of people will hoard gold and millions of others will want to buy solar power systems with energy storage, so the prices of gold and platinum will go sky high.”

“How much of your exports are arriving in the next few months? Half?”

“About that. About half of our gold and platinum are already sold on the futures market. That’s our standard arrangement. We will make a fair amount of additional money, but it sounds like we’ll need it.”

“If things get really bad on Earth, technology may be really hard to buy.”

“If the economic disruption is severe, yes. Shortages will delay deliveries, too. Thank God we now have solar sailers; they are less tied to launch windows.”

“I’ll keep my ear to the grapevine and let you know anything that isn’t classified, Will,” promised Brian.

“Thanks, I’d appreciate that, Brian. Well, let’s get back to the t.v.”

“Right. Bye.”

“Bye.” Will closed the line. Brian would probably pass some classified information to him; he could usually be counted on to protect Mars, as long as it didn’t hurt America’s interests. The big unknown was China; if it sided with Khaliestan, there would be a World War. But that was unlikely, and Tang wouldn’t have any inside information, so Will didn’t call him.

His attaché beeped with another message from Earth. This time it was Marshall, probably calling about the news on t.v. Will activated the video.

Marshall looked gaunt and shocked. There was crying in the background and Will was pretty sure it was Molly. “Dad. . . Taraz just died. He seemed to be doing better today, but half an hour ago he had a heart attack. We called an ambulance, but it was too late. They just got here and they haven’t been able to shock his heart back. We were giving him CPR, but they’ve stopped.” Marshall stopped to cry. Tears welled up in Will’s

eyes. “He was such a good man, and he came up to Cambridge when I was sick and helped nurse me back to health. He probably caught the flu from me, so I feel terrible about this. I . . . can you call mom and Paul and let them know, I just can’t. Bye.”

Will hit reply immediately. “Marshall, don’t blame yourself, this flu is killing millions of people. Taraz had a good heart and helped you because of it. You have a good heart and can help people as well in return. Don’t worry about mom and Paul, I’ll call them right now. I’ll let Jacaranda know as well. I feel terrible, too . . . I don’t meet people as saintly as Taraz very often. He was a special man and his reward in the next world will be great. When Molly can talk, I’d like to talk to her. We probably should establish an open line and chat back and forth in spite of the time delay. I’ll set up an open line with mom and Paul as well. Bye.”

Will sent the message. He stared at the attaché; he had to call Jacaranda, Paul’s fiancée, Taraz’s future daughter in law. Then he had to call the others.

He opened the drawer of his desk and pulled out his prayer book and prayer beads. He put the beads over his neck, but rather than starting to pray, he closed his eyes. He couldn’t pray yet. Tears began to well up again, and he cried.

10.

## Conflagration

7 August 2059

Sarah walked very carefully on the outer hull of the *Polaris*, the magnetic soles of her boots clicking into place against the metallic hull. It was a rounded surface of sharply illumined and pitch black areas; much trickier than it appeared. But everything in space was trickier than it appeared. Thirty-five meters above her head was a net; they were enclosed so no one could drift away. Behind her was the sun, shining parallel to the top of the *Polaris*; solar panels blocked much of the sunward side of the space, forming the shadows, and heat radiators blocked much of the antisolar side. It gave the area the feeling of a big, partially enclosed circular room about thirty-five meters across and high. Running right through the center of the room was the zero-gravity gym, and through its windows they could see, but not hear, a fierce game of volleyball.

She walked from the airlock to the edge of the ship, where she could look between the panels and through the net “downward” as well as outward into a frightening infinity. She paused to enjoy the view; so many more stars were visible than on the Earth’s surface, it was awe-inspiring.

She walked half way around the outer perimeter of the caravel’s dorsal surface, following a prescribed path. When she stopped she could see Mars: a bright, large, ruddy disk lay straight out in space in front of her. She hitched her safety harness to a railing and deactivated the electromagnets in her boots. As the pull waned, she felt her boots come free from the hull. Taking a deep breath, she pulled herself back to the airlock along the railing, using her hands and the safety haress.

“Excellent,” exclaimed Gaston Gilmartin, her teacher on the excursion. He then proceeded to remind her of a few precautions she could have taken better and gave her a few tips for controlling the motion of her body better. Still, it was a positive evaluation; Sarah was pleased.

It was Jacaranda’s turn next; she followed the same circuit as Sarah. Then the other two pupils took their turns. They had all learned well; Gaston gave everyone a pass. “Tomorrow we’ll hitch on a safety line and cross to the top of the gym,” he said. “It looks scarier than it is. We’ll watch some videos first, and you’ll all do fine.”

It was time to go back inside. But Jacaranda said “Gaston, can we go look directly through the telescope?” The ship had a forty-centimeter reflecting telescope mounted on its dorsal surface, and while it usually was controlled from inside, it was possible to look through it.

Gaston glanced at his watch. “Sure. It’ll give you more time outside.”

“It’s an antidote to cabin fever,” noted Jacaranda.

“That’s true, and we all have that right now,” he agreed. The five of them walked to the telescope on the *Polaris*, some twenty meters away.

With a spacesuit helmet, it wasn’t possible to look directly through a lens, so they activated a small viewing screen mounted on the outside of the telescope itself and ordered the telescope to look at Earth. Their home world, some three quarters full, suddenly popped into place in the middle of the screen. The ball of blue and brown had a darkish pall near the middle of the disk.

“My God, it’s Khaliestan!” exclaimed Jacaranda.

“No; it’s most of the Arabian peninsula,” replied Sarah. “The oil fires in Khaliestan obscure much of the peninsula.”

“But still, two months after the American invasion!” said Jacaranda.

“The guerillas are blowing up wells as fast as the wildcatters can blow out the fires,” replied Gaston. “What a terrible disaster.”

They all looked, one by one, at the Earth, with its big brown blot in the middle. “At least we can’t see the troubles in the cities,” said Sarah, when they were done. It had been a bad summer almost everywhere, and few were the cities where martial law wasn’t in place. The flu pandemic had mostly died down and immunizations would probably stop the infection the next winter, but the disruption of transportation had had long-term effects on supplies of everything and the high price of fuel had prevented efforts to restock shelves faster; furthermore, the fifteen percent shrinkage in gross domestic product had pushed unemployment up to between ten and twenty percent, depending on the city and country. All of Earth was seething.

Let’s look at Mars,” suggested Gaston. He pushed some buttons and the telescope began to turn by itself to focus on a much closer object, one that had a distinct, ruddy disk to the naked eye. They were just four days from aerocapture into Mars orbit.

The image of Mars popped into view and they took turns looking. The Tharsis Plateau and Valles Marineris were plainly visible in the midafternoon side of the planet, with puffy white clouds wreathing the volcanoes. Coincidentally, Phobos was also visible just beyond the planet’s limb as a small point of light. “It has more color than I imagined,” said Jacaranda. “It isn’t just grayish red.”

“I’m surprised how much the eye is fooled into seeing hints of green,” added Sarah. “Very impressive.”

“It’ll be good to be home,” said Gaston. “I think you’ll all love it. Aurorae Outpost is quite a place; very friendly and completely safe. I love the place.”

“It’ll be a welcome contrast to the world we left six months ago,” added Sarah.

They all turned and headed inside. It took half an hour to get off their space suits; then they headed back to their rooms. Sarah and Jacaranda, however, had scheduled a rendezvous at 11 p.m., three hours later, to jog together. A few minutes early, Sarah arrived at Jacaranda’s. Around and around the ship they went.

The *Polaris* rotated clockwise. They jogged counterclockwise at sixteen kilometers per hour, enough to increase their apparent weight by half. The meter-wide corridor was designated a jogging circuit at that hour, so everyone knew runners were going around it and were careful when walking through. The two women rarely could run side by side; there wasn’t enough space. But they still managed a conversation in brief bursts between breaths.

“Can’t wait to be able to run in new places,” said Sarah.

“Yes, the same hundred meter circuit for six months is boring,” agreed Jacaranda.

“Still, it’s amazing 125 people can live in such a small space and not go stir crazy.”

“This has been an interesting little microcosm, for me. I’ve gotten to know some pretty interesting people. It’ll be fun working with them on Mars.”

“Yes, I can’t wait to get to the surface. Better food, a wider range of diets, more places to see, and a real *outside!*”

“A spacesuit floating around on the dorsal of the ship isn’t much. Have you started ordering stuff for your flat? Oh, that’s right, you’re getting married right away.”

“Not right away; two weeks. I’m staying in someone’s house for the two weeks before the ceremony.”

“Why not move in with Paul? Being someone’s guest is pretty inconvenient.”

“Well, we can’t live with each other until we’re married.”

Sarah raised her eyebrow. “Oh. Old fashioned. I respect that.”

“We need two weeks to get to know each other again. We’ve been in daily videomail contact for two years, but that’s not the same thing as being together.”

“Very true. Has he recovered from his father’s passing?”

“The shock has passed. It was really rough, especially when it looked like his mom might succumb as well.”

“Thank God she made it.” Sarah saw a slight movement of a door on the right. She watched it closely to make sure no one stepped out in front of them; it remained cracked open, but when they jogged by no one stepped out. The person inside apparently heard or saw them coming and decided not to step out. “How are your parents?”

“Pretty good,” replied Jacaranda. “Did I tell you that my dad’s business never got any insurance settlement? The company declared bankruptcy.”

“So he’s doing without?”

“The store looks really ratty; you can still see where part of it was burned during the looting. But he says a lot of places look like that, so he’ll fix that part later. The trick now is buying new inventory and keeping it turning over.”

“Yeah, my aunt has the same problem with her store. My father’s problem is getting patients to pay, but I think India’s doing better than the U.S.”

They were coming back around and Sarah glanced ahead at the door that had been slightly open. It was still ajar. As they approached it, it suddenly opened and Robert Kampala stood there, stark naked. Jacaranda was startled. Sarah was momentarily, but the surprise was quickly replaced by anger.

“Oh, good evening, ladies,” said Robert, looking slightly surprised. But he didn’t immediately close the door, either; he stood there, posed. Only after they passed did he close the door.

“He’s crazy,” said Sarah.

“Huh? It was a mistake. Or, maybe it was a mistake.” Jacaranda began to think about the details of the incident.

“That was not a mistake. He opened the door the previous time we went around. He knew we were coming.”

“Really?” Jacaranda opened her eyes wide. “Why did he do that?”

“He’s crazy. I don’t know how he ever passed the psychological tests. He’s clearly a genius where fixing things is concerned, but still. . . early in the flight I ate supper with him almost every night. I think he thought I was interested in him. I had to say I wasn’t and he still bothered me; in fact, for a while he was sort of stalking me.”

“Really? I’d tell Commander Severin, especially after this.”

“Hum. Yes, I suppose I should.”

“I’m telling Will Elliott about it, so definitely tell Severin.”

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The next morning, Sarah Pannakar spoke to Commander Severin. By afternoon Elliott and Severin were sitting in Severin's small office, waiting for Robert Kampala.

"We may have to go get him," said Yuri. He glanced at his watch. "He's now twelve minutes late."

"Give him another minute," said Will. "Maybe the psychological profile will arrive in my in-box."

"I'm sure he was accepted for settlement because of his genius at repair. I'm told he does twice the work of anyone else. The nickname 'Mozart' is apt."

"Except it isn't just a nickname; he told me he was Mozart reincarnated. That's different; strange."

"That's true." Yuri looked at his watch again. "Well, I've got handcuffs right here." He opened the drawer of his desk and pulled them out.

"And you had a two week course in law enforcement on Earth, thank goodness." Will rose, then Yuri. Just that moment there was a knock on the door. Yuri put the handcuffs away.

"Come in."

The door opened and Robert Kampala stood there. He entered, a bit surprised Elliott was there as well. "How are both of you today?"

"Pretty good," said Will. He pointed to the other free chair in the room. Robert sat. Will turned to Yuri, to let him take the lead.

"We've heard about an incident last night, about 11:25 p.m.," said Yuri. "What's your version?"

"What have you heard?"

“I want to hear your side first.”

Robert paused. He turned to Will, who stared at him silently. He looked back at Yuri. “I’m really not even sure what you’re referring to. The only thing I can think of is the time I was about to go to bed and I heard what I thought was someone knocking on my door. So I went to the door and opened it and saw two women jogging by, so I closed the door.”

Yuri stared at him, watching the muscles of Robert’s face. “They say you opened the door ajar, then the next time they jogged by you opened it all the way and stood there in front of them, naked.”

Robert looked shocked. “Certainly not. I was ready to go to bed, heard a sound outside the door, opened it, then closed it.”

“I see.” Yuri pointed to his attaché. “Shall we take a look at the video? The hallway is public space and there’s a camera every fifteen meters. There was one six meters from your door.”

Robert’s face turned red. “What sort of world do we live in, where someone’s privacy can be violated so easily! This is outrageous!”

“Do you happen to know the policy about the use of camera recordings in public space?” asked Yuri.

“I certainly do not! I can’t imagine the cameras can be used for anything other than emergency and rescue!”

“Perhaps you should read the literature you’ve been provided more carefully, or listen in the classes,” replied Yuri. “The tape clearly shows the door being opened slightly as the two women approached it, then being opened fully for five seconds when

they passed it the second time. The imagery is quite revealing. Let's just say the two women are not the only ones who now know whether you're circumcised."

Robert stared at Yuri, angry, but said nothing. Yuri stared back, presenting a neutral face. He was stating the facts; that was what his face said.

Yuri turned to Will, who continued. "According to the Mars penal code—and all this occurred in Mars space, so Marsian law applies—your act was sexual harassment and lewd behavior. The penalty normally would be psychological counseling and a fine. A second offense would result in return to Earth. But the women may not press charges, so the penal code wouldn't apply. There's also an internal Mars Commission code of behavior. It says the Commission, if convinced a violation of the code occurred, can dock someone's pay and require counseling."

Robert looked at Will, waiting, and said nothing. Will waited for any kind of explanation or apology. Finally Robert smiled. "So, what you going to do?"

"What do you think's fair?"

He shrugged. "Dock me a month or two of salary and let's get this over with."

Will shook his head. "In a week we'll all be on Mars. I want you to report to Mariner Hospital to talk to one of the counselors within three days of arrival. Depending on what they say, I'll dock you a month or two, or consider other possibilities. Don't think your presence on Mars is guaranteed, either. If you really do the repair work of two people, we can import two replacements."

That startled him. "Okay."

"You can go now, Robert."

"Alright." Robert rose and left the room.

After the door had closed, Will looked at Yuri and he looked back. “He wasn’t contrite at all,” noted Yuri.

“No, and he’s the sort that doesn’t like psychiatrists.”

“Who does.”

“He’s the sort who can’t get used to them, then.”

“Your comment he could be sent back to Earth seems to have gotten his attention.”

“Yes. He had better talk to the counselors at Mariner, because if he doesn’t open up about his behavior, he’s going back to Earth.”

“Seriously?” Yuri was surprised. “We just spent several million to get him here.”

“I know, and I want to know why! He should never have been accepted. A million people who want to come to Mars. That’s immense competition for five hundred slots. There’s no reason to accept someone who’s weird just because he can look at something and fix it. So as soon as I get back to my office, I’m calling Houston and asking them to investigate his application and the process that led to his acceptance.”

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Three sols later, the *Polaris* streaked through Mars’s atmosphere at twelve kilometers per second, the fastest arrival in history. It dipped to within three kilometers of the surface in order to burn off its extreme speed, then rose out of the atmosphere and entered a 24.6 sol high-elliptical orbit around the red planet. It headed for Embarcadero Station, Mars’s interplanetary transit facility, and in less than a sol they rendezvoused with it.

As they approached Embarcadero, view screens throughout the caravel were focused on the station and its inflated statue, “The Spirit of Mars,” floating half a

kilometer away. Sarah Pannakar and Jacaranda Chamberlin sat at a table with a few of their friends in the cafeteria of the *Polaris*, watching.

“Mars’s statue of liberty,” noted Sarah. “It’s thrilling to see, isn’t it?”

“Yes, it makes me appreciate what immigrants felt when heading for Ellis Island,” said Jacaranda. “Interesting to put the flame under her—or his—feet, rather than in an upraised hand.”

“It gives the feeling of rocket flames. I’m surprised the being is neither male nor female.”

“The androgene represents all of humanity, not some mythic goddess,” replied Will, sitting at the next table.

“Ah,” said Sarah. “Do you think you’ll ever move the statue to Phobos, or some other place?”

Will shrugged. “Right now we have no plans to move the principal arrival and departure port from Embarcadero. If we used Phobos instead, arriving ships would have to perform a burn of half a kilometer per second to circularize their orbit, arriving shuttles from the surface would have to do the same, shuttles heading down to the surface would have to do it as well. . . Embarcadero’s orbit has been chosen carefully to minimize delta-v.”

“It’s a busy place, too,” said Jacaranda. “I count. . . five shuttles?”

“I think that’s right,” said Will. “Each can carry eighteen to the surface, so the caravel requires seven shuttle flights. It’ll be a week before everyone arrives at Aurorae, Dawes, and Cassini spaceports. But there’s more of Embarcadero to see than what’s visible on this screen. There are a half dozen solar sailers parked five to twenty

kilometers away, awaiting cargo to haul to Earth. Several of them were loaded up in the last five days by the shuttles you can see and may already be on their way to earth. There are also three tank farms; they're three kilometers apart and five kilometers from Embarcadero. Lifters are hauling fuel to them from Phobos and Deimos constantly, and shuttles often go to the tank farm before taking on passengers."

"It's a big facility," summarized Sarah.

"Exactly." Will nodded.

His attaché beeped with an incoming email from Earth. He glanced at the information; it was an urgent message from Pierre Messier. No one was sitting near him, so he put the message on screen so he could read it.

*Will, Interpol has just contacted us about Robert Kampala. After you contacted the Recruitment Department about him three days ago, they instigated a review of their clearance procedures and ran a series of routine checks again, including with law enforcement agencies. This time his name triggered a response. It turns out, four years ago in London, he was a roommate of Zek Daoudi, the spreader of the New York flu virus. After we inquired about Kampala, they did a check on him and found he had been in touch with Daoudi on several occasions last year and traveled to Khaliestan late last year. They regard him to be a suspect in the New York flu terrorism case and want us to question him immediately.*

Will stared at the message on his screen, shocked. Kampala certainly wasn't an Islamist, but he was anti-social. He could be dangerous.

He folded his attaché and headed for Yuri Severin's office near the bridge. People were forbidden to walk around the ship during the final minutes before docking, but he had to make an exception. Yuri had been copied as well; they had to talk.

The bridge was practically across the hall. When Will entered, he found it fully staffed with six people; the entire day and night shifts. Six large screens arranged on the walls of the room showed the scene all around the caravel; another screen on the ceiling and a small one on the floor even showed the view in those directions. Embarcadero was visible out of both the front and ceiling screens. Yuri sat in his chair in the center, watching the docking procedure. When he saw Will he stood. "I read the email. Let's go find him. Steele, you're in charge while I'm out. *Polaris*, where is Robert Kampala located?"

There was a pause. "Level five, environmental control area 2," replied the feminine voice that represented the ship's computer.

"What's he doing there?" asked Harold Steele.

"I don't know. *Polaris*, lock all doors around Robert Kampala and do not allow him to move about the ship. I want him to stay right where he is. Cancel all his passwords; he is not allowed to make any modifications to any systems or to open any controls. Is that understood?"

"Affirmative," replied the ship.

"Let me get the handcuffs. Harold, contact Gary Ruhlen, I want him with us. Will, get the exact position of Kampala on your attaché. Harold, activate the cameras in environmental control area 2 and watch what he's doing." Yuri strode across the bridge

and entered his office for a few seconds and emerged with the handcuffs. The crew of the bridge was startled; they had never seen handcuffs in space.

Will held up his attaché, which showed Kampala opening up the main air circulation duct. “He may have some of the virus.”

Yuri nodded. “Let’s go. Get Ruhlen there on the double!”

“I can’t find him; let me come!” replied Harold, sensing the urgency. He was a strongly-built man. Yuri nodded. “Okay. Dos Santos, you’re in charge of the bridge. Shut down air circulation immediately. We don’t want anything dispersed.”

“Acknowledged,” exclaimed Maria Dos Santos, turning to the controls. But Yuri and Will barely heard her; they had dashed out the door with Harold. They headed straight to the stairs and ran up to the top level, holding onto the railings tightly to keep their feet down on the steps as the gravity waned near the hub. The *Polaris* was divided into six air-tight sectors and each pair had an environmental control area; any two of the three environmental control areas could manage the entire ship. Environmental control area 2 supplied air to the bridge and the cafeteria.

They reached the door. Will looked at his attaché. “He knows air circulation has shut down,” Will whispered. “He’s trying to figure out why. He must be figuring out what happened, so we have to act fast.”

Yuri and Harold glanced at the screen to see where Kampala was in the room. Yuri nodded. “Let’s go. Computer, open the door!”

“Acknowledged,” replied the computer and the lock clicked open. Yuri grabbed the door and pulled it open; the three of them dashed inside and tackled Kampala.

Startled, the man fought back viciously. Will pinned down his right arm; Kampala leaned over to bite him while simultaneously kicking Yuri. But Harold grabbed him as well and pulled him the other way. Yuri, recovering from the kick, handcuffed him. Will grabbed Kampala's legs to hold them in place. Kampala emitted an ear-piercing scream.

"Forget it, Robert!" said Will. "Where's the stuff?" Then he saw a bump in the man's right pants pocket. He reached into the pocket, causing Kampala to writhe violently. A moment later he pulled out a plastic tube.

"That's it," said Yuri. "He might have more, though."

"We'll check," replied Will. "We'll rip the clothes off him, if we have to."

## Arrival

15 Aug. 2059

Less than twenty-four hours later, the shuttle *Maja* dropped from orbit, blazed through Mars's upper atmosphere, burned off its speed in a plume of ionized air, opened its parachutes, fired its engines, and settled onto Aurorae's Pad 7. Inside were the first eighteen arrivals from the *Polaris*, including Will Elliott and Robert Kampala.

Kampala was tied to his acceleration couch for the entire twelve-hour trip, except for a brief bathroom break when he was surrounded by seventeen men; they had rearranged the passenger roster so that no women were on the flight, to minimize privacy problems. As soon as the shuttle landed, the seventeen men carefully untied Kampala from his seat and led him through a pressure tunnel into a mobilhab, a large vehicle able to transport all of them to Arrival Hall. Quite a crowd filled Arrival Hall when the mobilhab entered through the airlock.

Kent Bytown, in charge of Aurorae's security, was waiting with two deputies. Will Elliott and three other passengers stepped out first; the crowd burst into applause when they saw their Commissioner back on Mars. Will nodded to Ethel and Lizzie, waiting for him in the front of the crowd, but he could not go to them yet. Robert Kampala was led out of the mobilhab by two particularly strong young men, who brought him to Bytown.

"Welcome to Mars, Mr. Kampala," said Kent, an ironic tone in his voice. Robert nodded slightly. "We have a place specially designed for you. A cell sheathed in nickel-steel; we've been welding for twenty hours straight. You'll have some lights, simple

furniture, and a bathroom. There are cameras watching you constantly, of course, and the computer monitoring them is programmed to report anything suspicious to us. You'll have no access to anything mechanical or electronic; we don't want to see your mechanical genius expressed in unexpected ways. You are being placed under arrest for attempted murder with premeditation. You will have a preliminary hearing tomorrow to determine probable cause for holding you. You will have access to an attorney. Have you any questions?"

"No," replied Robert apathetically.

"Then come this way." Kent and his two deputies took Kampala through the crowd and out of the hall.

All eyes now turned to Will. "Welcome home, Will!" exclaimed Ruhullah Islami.

"Thank you." Ruhullah walked to his friend; they shook hands. "It's good to be home."

"Everyone wants to hear from you, so please say a few words."

"Okay." Will anticipated that he might have to speak briefly at the arrival. He looked at the crowd, which numbered about seventy-five. "I'll deliver a major address at the Gallerie tomorrow at 12:30 p.m., where I'll talk about my trip, the situation on Earth, and the implications of this thwarted terrorist incident in Mars space. The last seven months have been unlike anything we have experienced before. It is now possible for the Mars Commission to operate between the two planets efficiently. Every columbiad either the Commissioner will go to Earth or top officials in the Commission will come to Mars. The round the world tour a group of us made galvanized popular support for the settlement of Mars beyond anything we had seen heretofore. It has generated hundreds of

millions of redbacks of sale of Martian land and investment in Martian resource recovery. In spite of the chaos Earth is now experiencing—which we can expect it to experience regularly from now on—immigration to Mars can be expected to increase every columbiad. Our challenge is to pay for our own expansion as much as we possibly can. We are also challenged to build a stronger society here to serve as an example to the masses suffering on our home world. We have to build that society in spite of the inevitability of terrorism and violence touching us here.

“Friends, it is so, so good to see all of you again. I can’t tell you how thrilled and relieved I am to be home. There’s no place like home, and this world is my home world now. I plan to lay my bones here. Your dedication to this place inspires me every sol and renews my confidence in our continued success.” He nodded thanks to them.

The crowd applauded and began to break up. The new arrivals to Mars had all been paired up with a local “buddy” and they began to find each other. Will headed to his beloved wife and daughter, hugging and kissing them.

“Welcome home, dear!” said Ethel.

“Thank you.” He kissed her again. He turned to his daughter, two months short of her seventeenth birthday; she was nearly as tall as he. He kissed her again. “You’ve grown.”

“I’m glad you’re home, daddy. Please don’t go away again.”

“Maybe we’ll go back to Earth with you next time,” he replied.

“I don’t think I want to go to Earth, after seeing the mess that happened there!”

“Yeah, I can understand that. I’m glad I got to see Taraz again. I miss him.”

“Poor Molly. She’s coped pretty well, but how terrible,” said Ethel.

“The flu almost killed her, too. It’s been a long climb back to relative normality.” Will shook his head. “I fear the worst for Earth. Terrorism has reached a new plateau. The hatred between the Muslims and the West has climbed to a new high. Energy prices have crippled the economy and recovery will take a decade.”

“We’ve got some pretty exciting plans for expansion of platinum group metals,” said Ethel. “But let’s not talk shop now. Let’s get you home.”

“Okay. Remember, we have a 2 p.m. meeting.”

“Oh, Will, can’t we have one sol together!” she exclaimed.

“I’m sorry, but we’re in a state rather like war. I have to meet with folks right away. It’ll be informal and pleasant.”

They piled Will’s baggage on a robotic cart and headed home, the cart trailing behind them like an obedient puppy. It thrilled him to pass through the different domes on their way home, to look up at the pinkish Martian sky through the transparent plastic, to feel the warmth of the sun on his skin, to breathe the fresh air of the enclosures, and gaze at the lush verdure that filled every square centimeter of their spacious domes. After twenty-four years on Mars, human beings had accomplished remarkable feats of engineering with raw materials and ecologies.

Andalus Dome, the heart of the outpost, 160 meters in diameter, their single largest space, was teeming with people, packed with new buildings, and the landscaping had achieved a new maturity. Their house was off a tunnel to the southwest of Andalus and filled two twenty-by-ten meter bubbles, which were buried for radiation protection. They lingered in their garden, receiving sun through several large skylights; Will was pleased to see how much his roses had grown in the thirteen months since his departure.

Just listening to the trickle of the fountain was a relief. They sat together, ate brunch—Will was starved after the twelve-hour flight—and talked about Will and Marshall’s time with Taraz, Molly, and Will’s mom.

“And how’s ballet?” Will asked Lizzie.

“Oh, it’s great. We’ve got a lot of kids taking dance now, especially younger ones, and the Aurorae Dance Academy’s an official part of the Aurorae school system starting next month.”

“I heard the borough is funding it That’s fantastic; it’s the sort of program that’s artistic and good exercise and unique to Mars. Just what we need to encourage.”

“The Mars Commonwealth Authority’s funding it as well,” added Ethel. “Along with basketball and the music and fine arts programs. Madhu’s absolutely thrilled. She’s got teams of older kids helping her with outdoor mosaics and younger ones are working on murals at several places inside the domes. And there’s now talk about building a ‘Music Hall’ for the music programs of the university, the public schools, and Mariner Symphony Orchestra. But we really need more people here to do the arts well.”

“Bit by bit,” agreed Will. “The thousand or so here now are pretty impressively talented, though.” He turned to his daughter. “So, senior year in high school!”

“Yes, it starts next month.” She smiled.

“Almost graduated. Hard to believe.”

“Yeah, I have to do a lot of thinking about Martech and what to study there. And I’m working at daycare fifteen hours a week over the summer; I’m cutting back to ten hours in September.”

“I hear Corey and Sammie are working for Silvio.”

“Yes, both of them. They practically run his store; he’s very busy with the bank.”

“The bank’s grown quite a lot and is handling stock sales and insurance,” said Will. “He has a bit staff working for him in Eritrea. One of the people who worked for him there for two years was on the *Polaris* and will be working for him here starting next week.”

“How is this new bunch of arrivals?” asked Ethel.

Will nodded. “Pretty good. That’s one advantage of floating through space with them for six months; I got a pretty good idea what we’re getting. I know them better than the folks who arrived during the eleventh columbiad, or even the tenth. They’re the youngest cohort yet; the median age is 26. I’m glad they’re arriving so young, they should have fewer fertility problems.”

“That’s a plus,” agreed Ethel. “I suppose you heard Ruhullah has gotten married. But they seem to be unable to have children.”

“That’s too bad; but then, Ruhullah’s what? Sixty-four, I guess.”

Ethel nodded. “And Nadia’s thirty-seven. Not too old to have children normally. He’s pushing the envelope, though.”

“I think he must have broken the envelope!”

They continued chatting around the fountain, relaxing and enjoying the roses in the garden, then Will went to unpack and wash. He and Ethel left the house at 1:40 and detoured to walk through the “Bahá’í Gardens,” a dome seventy meters square near them that was the site of a future Bahá’í House of Worship. Until the day came when they could build the temple, the plot of land was a lush flower garden with a central open-air patio for devotional gatherings. Under the patio three meeting rooms were now complete,

which provided them with a place to host Bahá'í children's classes. They said a few prayers, then walked hand in hand to Andalus Dome. The meeting was in a very comfortable hospitality suite on the second floor of the Gallerie, partially overlooking the "mall" area and partially opening on Andalus Square, with convenient access to the restaurants of the mall.

Ruhullah Islami, the host of the gathering, warmly greeted them. They grabbed plates and grazed the buffet table, then sat on chairs, arranged in a big circle, to chat. Gradually, the others arrived. Alexandra and Yevgeny Lescov, directors of Construction and of Exports, were first. They were followed seconds later by Érico Lopes, Chief Minister of the Mars Commonwealth Authority. Rachel Evans, the Authority's Director of Safety, was next, with Roger Anderson, the Commission's Director of Science and Exploration, right behind her. Kent Bytown, Chief of Security of the Borough of Aurorae, followed a minute later, then Dr. Hun-jai Park, their economist. Five minutes later, trailing fashionably late, were Emily Scoville-Rahmani, Commander of Cassini Outpost; Gerhard Bach, Vice President of Mars Operations of Muller Mining; and Silvio Diponte, President of Silvio's, one of their two retail outlets, and President of Mariner Bank. Trailing behind everyone was Lisa Kok, Director of Environmental Management for the Commission. Last but not least was Dr. Enlai Tang, President of Mariner Institute of Technology, who apologized that he had gotten off a shuttle from Embarcadero sixty-six minutes earlier and had barely had time to go to his flat, look at thirteen months of dust bunnies, and catch his breath.

They sat in the circle of chairs, munching the excellent food and catching up, for half an hour. Then Will spoke. "I wish all our meetings were this informal and pleasant,

but we have to get some business done. Three sols ago Ruhullah and I were talking about a review of plans after I arrived and he suggested a large gathering consisting not just of Commission directors, or even of Commission and Authority officials, but a broader one including representatives from business and from other outposts. So here we are. We don't have authority to do anything, as a body, but as a group we can take a pool of common ideas back to our various operations.

“The last seven months have been pretty dramatic ones on Earth, but the pattern goes back a decade to the computer virus attack and the nuclear attacks on Paris and Houston. The Earth is getting more and more unstable politically and economically. The price of gold has tripled, probably permanently. Petroleum production is declining and the price of energy has permanently increased. More and more experts are talking about the possibility of a spiral of violence over a shrinking economic pie, which in turn shrinks the pie and stimulates more violence. Some experts are even saying that the sociopolitical collapse that some countries have seen—in Africa, for example—may be examples of what all of Earth will soon experience.

“We've all read these prognostications before, or heard them on television. We have usually dismissed them as apocalypticism and not taken them seriously. But my one-month of experience on Earth has given me a different perspective. In many concrete ways, the fabric of culture and society on earth is unraveling; political processes, in particular, are becoming more complex and less able to response to difficult needs. I think we need to take these trends more seriously.”

There were blank stares on many faces; clearly, the Commissioner's new perspective on things did not connect with his staff. Will looked at the expressions on

their faces. “Let me be more specific, since I’m not talking about doomsday. We need to grow this place as much as possible and we need to move as much as possible toward economic self-sufficiency.”

“What about the pledges you got on your trip?” asked Érico.

“We’ll take them if we actually get them, but after fifty million people have died of the flu and the world economy has shrunk five percent, it’ll be hard to collect all of it.”

Érico nodded. “So, you’re talking about a big expansion of exports, which means gold and platinum-group metals.”

“Yes. We have five times the population that we had seven years ago and a vast increase in capacity; we have a solar cell production facility, a greatly expanded manufacturing base, and a lot more robots able to do a lot more things. We’re in the position to handle millions of tonnes of ore. Our transportation system back to Earth is stronger and cheaper than ever before. Gold and platinum-group production are up *and* the prices are staying up. The chance of either market collapsing in the next decade or two is pretty low. We need to set our goals high.”

“And what do you envision where self-sufficiency is concerned?” asked Alexandra skeptically.

“First, a big study to determine what we are importing, product by product, and how difficult it would be to substitute a Martian product for each one. Second, a study to determine at what point we should start making each product. Third, a study to determine how we could manufacture the substitute if it becomes unavailable on Earth.”

“That’s a tall order,” protested Park. “It’s impossible to create a thorough report; we’re studying moving targets because our needs keep changing and our capacities keep changing.”

“True,” said Will. “The report can’t be perfect. But what if some sort of terrorist act cuts the Earth’s economic activity by twenty or thirty percent? A lot of imports we get now may become unavailable or difficult to obtain. We need a plan.”

Ruhullah and Érico nodded, as did a few others. Enlai spoke up. “I fear these steps are necessary. I made a tour around Earth’s universities. Will is right; most societies struck me as much more polarized, self-centered, and politically paralyzed than ten years ago. Terrorism is getting worse, and the destruction of Turanistan and Khaliestan won’t end it. Meanwhile, petroleum production can only decline. China, India, and Europe are making massive investments in alternative energy. As for their pledges to support Mars, every nation on Earth has been investing less and less in space over the last decade, or they have been devoting a lot of their investment to projects that made political sense rather than scientific sense. We have to pay for the immigration ourselves.”

“That’s what my gut says also.” Will turned to their economist. “Hun-jai, what sort of income do we need to cover the costs of importing 7,000 people over the next seven columbiads?”

“We’ve drawn up the expenses in detail,” Hun-jai replied. “The solar sailers are cutting the costs of importing goods at the rate predicted. It’s harder to predict the cost of launching goods into low earth orbit; a big decline in traffic to LEO could increase our costs or could cut them when people compete for our business. We’ve also been updating our income projections as the price of some exports rise and others, like water, fall. If you

assume no government subsidies at all—both the new pledges and the old commitments—we need to replace eight billion redbacks per year. At 50 million redbacks per tonne and a return to Mars of eighty-five percent of income, we'd need to export 200 tonnes more of gold or platinum-group metals per year; that is, 200 tonnes more than the already projected increase.”

“That’s a lot; our projected exports would have to grow from the current 200 to 800 tonnes per columbiad,” said Yevgeny. “And you’re assuming twice the income per ounce than we had been assuming two years ago. And every year our production expenses go up as the quality of ore goes down.”

“That’s true of gold, but not platinum-group metals,” noted Gerhard. “This is the sort of change of priorities we’ve been hoping to see for some time. A big increase in production was not possible because of limitations of staffing and equipment. Our costs of producing gold have tripled in a decade. But the costs are now leveling off and resources here are now growing substantially. If you let private investment do most of the expansion, they’ll borrow from banks.”

“We’ll get a lower return per tonne,” noted Yevgeny.

Gerhard shrugged. “You’ll make up for it in volume. Production costs for PGMs are lower here than on the moon, and transportation costs are only a little higher.”

“The new PGM fractionator tower is pretty efficient,” added Ethel. “It can process 1,000 tonnes of nickel-iron per sol, producing 33 kilograms of platinum-group metals and gold per sol, or about a tonne per month. It consumes 5,500 kilowatts of electricity and 4,000 kilowatts of heat. The tower takes 150 workers about a year to construct; it costs

200 million redbucks, including imported equipment. But once operating, it pays for itself in one year.”

“We’d need bigger ones; maybe five thousand tonnes per sol,” said Yevgeny.

“Definitely,” agreed Ethel. “That would make sixty tonnes of PGMs a year. Ten of them would produce the level of exports we need, with a surplus for maintenance. But each tower would take about 600 workers one year to build, and we can’t spare that level of staffing right now. They’d also go through almost *two million tonnes* of nickel-iron per year each; over 200 tonnes an hour; that’s a lot of robotic excavators and ore trucks. And each would consume about 25,000 kilowatts of electricity, plus another 25,000 kilowatts for the excavators and trucks. Each tower and related equipment would cost about a billion redbucks. There is no quick, cheap way to expand production.”

“Still, we *are* talking about a solution,” replied Gerhard. “Gold recovery costs about the same amount; we’re processing 5,000 tonnes of rock to extract a tonne of gold. We can’t afford 600 workers per year to construct such towers right now, but it’ll be easy when we have two or three times as many workers as we have now.”

Will nodded. “That’s true. Alexandra, how many of the thousand-tonne towers can we build per year?”

She hesitated. “What do you want to cut? The construction budget includes one tower per columbiad, and when you told me on the flight back that we had to increase platinum production, I rearranged things to budget for a second tower. But we have to slow the construction of one caravel.”

There was silence around the circle. “We don’t want to get back in the situation we were in a few years ago, when we had a housing shortage and nearly had a food shortage,” said Érico.

“Food shortages are not a risk,” replied Lisa Kok. “Mars has almost 300,000 square meters of pressurized space. Some is dedicated to housing and some to bioarchive, but both of those uses can accommodate limited food production. New Tokyo, up on the escarpment rim, is the big expansion; the eight enclosures will total 39,000 square meters. The folks at Aram are adding 28,000 more. Andalus Northeast and Northwest will add 15,400 square meters to Aurorae. Those two expansions alone will feed the arrivals next columbiad.”

“We could slow down our projected expansion,” suggested Emily Scoville-Rahmani. “Andalus Northeast and Northwest could be postponed. Cassini—”

“Not a good idea,” interrupted Lisa. “We need the space, and it’ll help protect Andalus.”

“Whatever,” replied Emily, irritated. “Cassini is willing to postpone its expansion. We’d rather have a big PGM separator than more farmland. I’m sure the same is true with Dawes.”

Gerhard nodded. “Absolutely. Between those two projects, you can probably spare thirty workers.”

“We’ll keep the Andalus projects and slow Cassini and Dawes expansion, then,” suggested Will. “There’s something else we can do, also. Half the construction on housing and office space here is being done by private contractors, specifically Afigbo Construction and the new Deseret Construction Company. The Mormons started the latter

to build their temple, but I bet we could persuade them to postpone the temple a year if we offered a deal.”

“What about the Bahá’í temple?” asked Alexandra.

“We want to start it by April 2060, but we could stretch out the completion date,” replied Will. “The other thing we can do is pack more people into the four caravels arriving in 2061; we can raise the immigration by one hundred that way. That requires more work at this end to provide them with housing and consumables, but with more private construction and greater efficiencies, we can manage.”

“We can squeeze the existing labor allocations, also,” said Érico. “We have 500 arrivals; we can postpone educations a bit, move a few laboratory assistants to construction, etc. That should free up twenty people.”

Alexandra nodded. “I suspect we can squeeze to build a third tower this columbiad using the various efficiencies just mentioned.”

“We’re going to need portable units, too,” said Roger. “We’ve got 8,000 kilometers of improved roads and they pass by a lot of lag deposits and impact debris. There are even a few enstatite-chondrite or ataxite impactors that are five to ten times richer in nickel and PGMs. We won’t find a few hundred million tonnes of nickel-iron in one place.”

“That’s a real challenge,” agreed Gerhard. “We need to search for those enriched impactors.”

“We’ve been looking for two years,” said Roger. “We need a bit of luck.”

“Okay, we have the outline of a plan,” exclaimed Will. “Alexandra, Hun-jai, Yevgeny, Ethel, Gerhard: can the five of you serve as a task force to propose a plan to

double the rate of expansion of PGM and gold production. I think we can have some sort of tentative plan in a month.”

Hun-jai nodded. “A month should work.”

“Is this part of your announcement at noon tomorrow?” asked Érico.

Will nodded. “Yes, it’s half. I need to talk about the danger of terrorism and how we can abate it. I plan to announce an independent panel to investigate how Kampala was accepted to fly to Mars. Then I’ll turn to our development plan. Regarding the first, Kampala is a very dangerous captive because he has an incredible ability to make things. He’ll be hard to keep confined.”

“Don’t worry, we’ll manage,” replied Kent. “The computers are watching him every millisecond and have excellent software for detecting questionable behaviors.”

“Good. He has the ability, if he escapes, to carry out major sabotage in the outpost. The plastic vial we caught him with was not opened, so there is no contamination, and we found no other vial or container anywhere on his person or in his room. The folks at Mariner Hospital are preparing to extract some of the powder and inject it into a mouse or a chicken to see what it does; they’ll also send microscopic and x-ray imagery to the Centers for Disease Control in Atlanta. We should know in a week or two whether the vial contains flu virus or not.”

“Has he talked at all?” asked Érico.

Will shook his head. “Not a word. Yuri was trained in interrogation techniques while on Earth, but he hasn’t had time to apply them. He’ll be down in a week or two and will start systematic interrogation then.”

“I’m already in touch with Interpol,” added Kent. “They want him to talk; his information could crack open the case.”

“So will we send him back to Earth?” asked Érico.

“Good question,” replied Will. “There will be a trial for attempted mass murder. We don’t have legislation on the books for that crime, so the laws of the state of Texas apply. Kampala’s attorney is likely to argue that French law should be in force because it has no death penalty.”

“The death penalty will be immensely controversial here,” said Érico. “Most of us come from countries that have banned executions.”

“I know. And there’s the issue of carrying out the sentence. But we can’t lock him up for life, either; he’s too dangerous. Possibly we could exile him to some remote spot on Mars where we could use a one-person observation post. Hauling him back to Earth could be dangerous because he could destroy the ship.”

“Every scenario is bad,” agreed Ruhullah. “Will your talk tomorrow be your usual ‘State of Mars’ address?”

“That’s scheduled for next week and I think I’ll keep it for the big gathering after everyone lands. But tomorrow will cover many basic items, so the two will overlap.”

## Welcomes

late August 2059

Paul Nuri waited in Arrival Hall nervously. He hadn't seen Jacaranda in two and a half years. Audio and videomail was never the same as being *with* someone; they were in touch daily, but had never been able to touch. He thought about how beautiful she was and how he yearned to marry her. Thank God the shuttle *Simud* had just landed safely.

The airlock's status light changed to green; the interior had finished pressurizing. The inner door opened upward and a few seconds later a Mobilab drove into the hall. Its back door opened and eighteen passengers began to step out. They were a parade of humanity, light and dark skinned, with curly or straight hair, brown eyes or blue, male or female. Jacaranda was near the end.

She stood in the doorway a moment, then spotted him and hurried over. "Paul!"

"Jacqi!" He replied. She dropped her two suitcases and they embraced, kissed.

She looked up at his face and their eyes met. "Welcome to Mars."

"Thanks. I feel like I'm home, now."

"I hope so. It's a great place."

"Any place with you is great."

"Any place with *you* is great." They kissed again, then lingered in each other's embrace. "How was the flight?"

"The flight out will always be remembered for its ending; who remembers the rest? The flight down was long, you get very hungry, and the landing is very frightening."

“It is, and you never get completely used to it. I wish they wouldn’t show video of the surface rushing up at the ship. If they didn’t, you’d never know. Thank God you made it safe and sound. The terrorist plot is very frightening.”

“You should have been on board! I knew Robert Kampala.”

“What sort of fellow is he?”

“Reclusive, with poor social skills. But we never thought he’d try to kill us.”

“He isn’t talking, either.”

“They should rough him up. He was part of a plot that killed sixty million people.”

“Dealing with him is very controversial; we want Mars to be a much better society than Earth, but no one is sure what that means. Come on, let’s go to the Elliott’s.” He picked up her suitcases. “Shall we take the South Tunnel?”

“No, I want to be in sunshine and greenery. I’ve been stuck in a tin can for six months.”

“I remember what that was like.” Paul led them into Yalta Biome, their oldest enclosure, and Jacaranda heaved a sigh with relief. They strolled under the mature fruit trees filling the central yard and looked at the buildings covered with laden grape vines. The patio at the eastern end had tables for the Mariner Institute of Technology’s cafeteria.

“Ah fresh air,” said Jacaranda. “Well, not fresh, exactly; the air on board ship was clean. But it was sterile, or artificially perfumed. This air smells of vegetation.”

“It’s pretty hard to reproduce that smell. Can you imagine what it was like, the first eight years, when they had a few plastic greenhouses and no real expanses? It must have been tough.”

They passed through an airlock and a tunnel, then entered Riviera Biome which was identical. “That would have been hard,” agreed Jacaranda. “I don’t know how well I’d do on an expedition where all I see is barren range for months.”

“It’s not bad. When I’m out on the range I don’t miss plants. Don’t even think about them. I love the land here: rolling, rocky, a range of russets, with dunes and crater rims, rarely flat and boring. This is a pretty interesting place.”

“I guess I’ll see; I’m scheduled to do video reporting on an expedition in six weeks.”

“I remember! I wish they gave you more time after the wedding!”

“We’ll have to make it be enough.” They left Catalina and crossed into Huron. She was briefly distracted by the larger enclosure and its weather; it was mid summer and everything was lush. “It’s so good to be with you, Paul. It’s hard to believe we haven’t seen each other for over two years.”

“And that we’re getting married in two weeks! Sometimes it sounds unbelievable, but it feels right, Jacqi.”

“For me, too.” She blew him a kiss and they both smiled.

“It’s a shame we have to wait for the wedding,” added Paul.

She smiled. They entered another tunnel and a moment later emerged into Colorado: hotter and drier; aspens and pines instead of the more humid summer heat of the Great Lakes with its oaks and maples; sixty meters across; cylindrical housing units clustered in various spots, with strips of farmland and nature between them. Jacaranda stopped to inhale. “Smell the air; it’s more. . . piney.”

“Every biome has a different smell. That’s one of the nice things about this system; you rarely notice how the air smells differently from place to place on Earth. When do you have to go to the studio?”

“Monsol, but I’d like to visit quickly this afternoon.”

“Okay. I’ll go back to work and we’ll have more time later. We’ve done some interesting experiments lately. We’re taking volcanic samples, crushing them, adding water and gas to replace the volatiles lost during eruption, and subjecting them to high heats and pressures to simulate the lower Martian mantle. We’re beginning to figure out the volatile concentrations, along with heat and pressure, which produce the melts like the stuff coming out of the volcanoes. Maybe that’s worth a news story?”

She smiled. “A small one.”

They exited Colorado and passed through another pair of airlocks and a tunnel into Columbia. It was hotter and drier, like the Columbia River plateau of eastern Washington, and packed tightly with cylindrical housing. “Boy, this is a long walk!” said Jacaranda. “I knew about all these domes, but I never thought about how long the outpost is, from end to end!”

“The Outpost has a sort of triangle shape because as it has grown westward from the original habs, and the domes have gotten larger and larger, so the width has grown as well. It’s now just a little less than a thousand meters long and the maximum width is 340 meters. Andalus is in the middle, which is convenient. We now have twenty-seven domes. When the last nine domes opened in the last two years and the place doubled in size, people started to jog!”

“We’ll need public transportation pretty soon.”

“That’s why we have the north and south tunnels; they’re already one way for vehicle traffic. In two years, after the next flood of arrivals, they’ll start robotic bus service.”

They reached the western end of Columbia. As they entered the tunnel, Jacaranda glanced around one more time and said “how cold does this dome get in the winter?”

“Below freezing for a few weeks, day and night. Too cold to walk across without a jacket, though you can run across it. The vegetation needs the cold.”

Jacqi nodded. They exited the tunnel and entered Bangalore—a tropical biome stuffed with housing cylinders—and hit high heat and humidity. “Wow.”

“The climate changes are a bit shocking; that’s why some prefer to walk the tunnels. But I like the changes. We’re three and a half months from the northern hemisphere spring equinox, which is when the sun stands over the equator. Since we’re on the equator, that’s midsummer for our domes. You’d think that means it’s spring right now, but our winters are rather short and summers are long, so it’s already summer in all these domes. That maximizes the growing season. For Bangalore, it’s monsoon season. You don’t want to be lounging around in here between 2 a.m. and 5 a.m.; it’s raining.”

“Kids here must learn about a lot of ecologies!”

“Definitely. When I walk in Huron I feel at home; the climate and vegetation are like Connecticut’s. It’s comfortable and the other domes seem exotic. But for the kids growing up here, it’s all familiar. They learn the names of a lot of species in school!”

“I suppose they don’t know the ecology the same way, though. In Connecticut, you could go for a walk in the woods.”

“True, the ecologies in these suburban domes are pretty limited and artificial. But there are now five bioarchive domes and three bioarchive sections of domes, and while they’re small, they’re wild.”

“Is there any winter sports?”

“Sure, sledding and skiing, though the slopes are very short and low. And there’s skating.”

“Has anyone tried to ski at the poles?”

Paul shook his head. “Spacesuits are not supple enough and dry ice snow isn’t slippery.” He pointed to the side of Boat Rock south of them, which was just visible above the dome. “There’s talk about doming over part of the side of Boat Rock! But it’s speculation. It would provide pretty views and a nice ski slope.”

They reached the western side of Bangalore and passed through to Andalus. They were suddenly in an urban space with narrow streets and buildings up to five stories high. Jacaranda was startled by the change. The air was pleasant, the temperature and humidity comfortable. She looked at the façades of vinyl covered by sand appliqué to make them look like Martian sandstone: red, brown, buff, and yellow, some buildings using two or more colors to accent windows and other features. After thirty meters they reached Andalus Square, a big, open space eighty meters long and sixty wide. The north side was dominated by the Gallerie. “We eat in there,” said Paul, pointing. “But more and more people bring their food to the tables in the square. We’re getting more businesses, too, now that Aurorae’s population exceeds a thousand and Mars has hit 1,600.”

“I like the campanile.” Jacqi pointed to a tower on the north side of the newly-finished Commonwealth Building, the seat of the Mars Authority.

“Yes, it has a great view, too.” They reached the western end of the square and turned south into another street. “Our apartment is that one.” Paul pointed to a fourth-story set of windows on the east side of the street. “We have a lot of setting up to do! Sixty square meters; three times as big as my former flat. Since moving in last month, I haven’t arranged it at all!”

“You’re sweet.” She kissed him. “Now I don’t have to undo everything you did.”

“My arranging wouldn’t be that bad!”

“I’d probably even like it, but arranging is my job.”

“I know, and I have to do all the hard work of moving the furniture.”

“And we’ll both live there together in just two weeks,” she added, and she hugged him as they walked.

They continued down the street, Jacaranda’s hand around Paul as he lugged the suitcases, and entered a tunnel. It led to Andalus southwest, a small “satellite” dome seventy meters across, which housed the Bahá’í gardens. Near the end of the short tunnel they stopped. It was the house of Will and Ethel Elliott. “Computer, this is Paul Nuri and Jacaranda Chamberlain. Please unlock the door.”

The door’s lock clicked and they pushed open the door. Paul quickly showed Jacqi around; she was very impressed by the house. She settled her suitcases into Marshall’s old bedroom, then they walked to the Gallerie to start shopping. They had a lot of furnishings to buy.

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Every day a shuttle descended to Aurorae, Dawes, or Cassini with eighteen people. The caravel also brought special foods—steak, sea food—and luxury goods that required a

cargo flight. Consequently, eight sols passed before everyone and everything was safely on the Marsian surface. The ninth sol after the first shuttles landed was a Saturisol, and lunch was the big, special arrival banquet. Simultaneously, at Dawes and Cassini where it was supertime, and at Meridiani, Thymiamata, and Aram—where it varied from early evening to mid afternoon—the residents gathered for their banquet buffets as well, all paid for by the Mars Commission.

As Will got in the buffet line, Simeon Afigbo approached him. “Dr. Elliott, it is so good to see you again.”

“Thank you, Simeon. I’m delighted to see you again as well.” The two men warmly shook hands.

“I want to thank you again for encouraging me to go into business. It has worked out quite well.”

“Excellent! You did a great job on my house. We need more private business up here, and we especially need more construction firms. How many units have you built?”

“Ten. You’ll like the designs. We’ve purchased and buried four standard modules. Each one has a corridor a meter wide running along its length with airlocks at each end, and has a garden four meter long and nine meters wide toward which all the units face. People love having a garden, even a small one. Usually the garden is in the middle, so you have two first floor units nine meters wide and eight long facing each other across the garden. Because of the curvature of the dome, the second story is only five meters wide but it’s still eight meters long; in some cases they’re separate apartments for single people and in other cases they’re additional bedroom space for families.”

“They sound very comfortable. And they’re selling?”

Simeon nodded and lowered his voice a bit. “Yes, people like them. I’m selling them for 10,000 redbacks per square meter, so a typical 72 square meter flat costs 720,000.”

“That’s a good price. And you’re making a profit?”

“Sure, about twenty-five percent.”

“Alexandra won’t be pleased to hear that.”

“We can build flats about thirty percent cheaper than she can. It’s a fact.”

“It is. And you’re planning more?”

“Definitely! We’ve purchased the entire strip between Cathay and Punjab. I can put in sixty modules, potentially able to house about 600 people, worth about sixty-seven million redbacks.”

“How long will it take you to build all those units?”

“Five or six years. I have shortage of skilled workers.” He smiled. “I have one problem, though. The borough government insists I leave one third of the module space unbuilt, and they want some of that left as open modules for recreation and park space.”

“you can’t blame them, can you? We only have so much public space. If you were to add 600 people to Cathay you’d double the number of people using the park areas in that dome.”

“That’s true, but it raises my expenses quite a bit.”

“Is that figured into your profit?”

“I suppose I’ll have to, if they don’t bend!”

“That partially explains why you can build your housing thirty percent less expensively than Alexandra. Leaving some open space is part of the cost of doing business, my friend.”

“I know.” Simeon sounded disappointed. They shook hands, then Simeon, who had already gotten his food, headed for a table. Will continued forward toward the food. Then Rev. Greg Harris walked up.

“It’s good to have you back, Will.”

“Thanks, Greg. It was a long trip, but I think it was worth it.”

“Yes, I read on the *Mars This Sol* website that the United States and China, at least, are providing the pledged amounts this year.”

Will nodded. “I guess it reflects the competition between them. Either way, I’m relieved to be home!”

“I bet. I was just in Cassini for two weeks setting up a church there.”

“Good. A Bahá’í group is forming there soon as well. This columbiad there were eight Bahá’ís arriving among the 500 new people, and we grew by nine since 2057, so Mars now has 43 Bahá’ís, and five are at Cassini.”

“Not bad. Congratulations,” said Greg, though he sounded uneasy. In the last two years two of the new Bahá’í converts had been rather enthusiastic and that had raised eyebrows. On the other hand there had been a few converts to other religions, including one person Greg had baptized as a Catholic who had been raised Protestant.

They waved goodbye. Will turned back to the buffet line. The Reverend Greg headed for his table near the front door of the Gallerie. His wife, Anna, was already there with their two kids: John, 8 ½, and Ester, 6 ½. With her was Sarah Pannakar; Anna was

her “buddy” for her first week on Mars. John Hunter and Vanessa Smith had just arrived with their suppers and with their two children: Maaka, almost 9, whose name was the Maori equivalent of “Mark,” and Wicahpi-luta, 5 ½, whose name meant “Red Star” in Lakota. The boys’ names reflected the heritages of their mother and father respectively. The kids immediately began to talk and play amongst themselves; they were as close as their parents.

“Where’s Kevin?” asked Greg.

John pointed. “He’s on his way; he was talking to friend.”

A moment later, Dr. Kevin Redpath, a Canadian Indian who was a veterinarian, arrived with his tray. They made room; the table was pretty crowded. “Have you met each other?” Greg asked Kevin and Sarah. When they shook heads he introduced them. “It’s nice to meet you,” said Kevin, offering his hand. Sarah shook and was surprised by his weak grasp. He was not a hand crusher. He was intriguing; he had a handsome face with a strong jaw and, like John, he had a long braid of black hair.

“Pleased to meet you,” she replied, with a smile. “Are you newly arrived as well? I don’t remember seeing you on the trip.”

“I arrived five months ago on the *Courageous*,” replied Kevin. “I take it you were on the famous flight, then?”

“Yes, the one with the terrorist. I even knew him a little. He didn’t have any friends.”

“So we’ve heard,” said Greg. “I’m glad to meet you finally. Anne has said a lot about you.”

“It’s good to meet you finally as well,” replied Sarah. “I’ve enjoyed my time with your kids.”

“I gather everyone on board felt shock more than fear,” observed Kevin.

“Y. . . Yes,” replied Sarah. “Initially, anyway. We were afraid too, because he might have had other vials he had released into the air supply.”

“Now that no one has developed symptoms, after almost two weeks, we can finally feel safe,” agreed Kevin. “It was the worst moment to date in interplanetary flight.”

“I think so,” agreed Greg. “It was just about the worst moment down here, too. Everyone’s talking about it. The only thing worse has been when we lost people.”

“And I suppose the big question now is whether we put him on trial, and if he is found guilty, what to do with him,” said Kevin.

“We’ll certainly put him on trial. He committed the crime here; we have jurisdiction,” said John. “But the matter of punishment is controversial. I would favor the death penalty for such a premeditated act of attempted murder.”

“You’d favor that?” said Greg, surprised by his friend. “He didn’t actually kill anyone, John. I’d rather see Mars remain a planet without blood on anyone’s hands.”

“We have to have justice, Greg, and that means ultimate penalties for ultimate breaches of civility.”

“But is execution just?” asked Greg.

“I can see this is a hot issue; I’m sorry I brought it up,” said Kevin.

“It’s already been debated a thousand times in here,” added Anna.

“What took you to Cassini, Greg?” Kevin asked, changing the subject.

“We founded Mars’s second Catholic church. Cassini has a very capable religious leader in Mike Jachimaiak.”

“Yes, he organized all the Catholic activities on the flight out,” agreed Sarah. “A great guy. He’s the new head of Cassini’s schools.”

“So, there was no priest on this flight,” said John.

Greg shook his head. “Just Jachimaiak, who’s a deacon. At the last minute the priest’s father developed cancer and he decided to stay home.”

“How is it that you can be married and a priest?” asked Kevin. “I’d think that’s really controversial.”

“Not here,” replied Greg. “I arrived as an inactive priest who was serving as a nurse and therapist and soon found myself serving as full-time priest as well, so the Commission made an agreement with the Church to fund me as a priest. Then I fell in love with Anna. There was no one to replace me, so the Vatican let me keep the job. And now if another priest arrives there will be need for two of us!”

“As long as you stay out of Catholic controversies on Earth, dear,” added Anna.

“Yes, I don’t speak out about the issue of married priests.”

“I’m generally impressed by the role of religion here,” said Kevin. “John organized a First Nations prayer ceremony at the natural bridge up by the Dacha yestersol, and no one batted an eyelash.”

“How did that go, by the way?” asked Greg.

John nodded. “Pretty well. In addition to a dozen invited friends, we had eight ‘First Nations’ people there: Kevin, Vanessa, and I, two Africans, an African-American who was partly of Indian blood, a Fijian, and a Roma.”

“A Roma? Are they ‘First Nations’?” asked Greg.

John shrugged. “They’re a minority with a substantial spiritual tradition.”

“But this proves my point, doesn’t it?” persisted Kevin.

Greg nodded. “Sure. Mars has a highly educated, diverse population. Those two things generally make Marsians tolerant. Contrary to all sorts of secular assumptions, education does not convert people into atheists; it decreases the number of fundamentalists and increases the number of agnostics, but the vast majority of the people here are religious in some sense. This place can’t claim to have been founded by Christians or any other group and then have ‘fallen away’ from its heritage; its heritage is diversity on religious matters, including agnosticism and even atheism. So no one group can claim a privilege based on history. Europe was culturally traumatized by the Spanish Inquisition and other religious extremisms, but we have never experienced anything like that. So religion has a respected place in the public discourse here, but no one expects it to dominate.”

“What about moral issues like abortion?” asked Sarah.

“This is not a formerly Catholic or formerly religious society that has fallen away from traditional moral standards; it is a secular society with a sharp distinction between public and private moral standards. If we disagree with the position that public morality takes, our role is to persuade others our standards are better. By custom and culture, our elections occur without open candidates, which means no political campaigns and platforms. This means that issues arise in elections in different ways and emotional issues can’t get focused on people as easily.”

“That’s good,” said Kevin.

Greg nodded. “Our election system is the big surprise about Marsian culture. Arrivals don’t understand it, but once they see the results, usually they’re pleased.”

“What do you make of the dream that Marsian society is utopian?” asked Kevin.

“It’s mostly silly,” replied John. “A society with no strife, no crime, no poverty, no discrimination. . . . well, there are about 1,300 adults on Mars now, they’re selected from a large pool, they’re highly trained, so naturally there’s no unemployment. None of them are interested in mugging or burglarizing—if they were, they wouldn’t have been selected—and most crime is done by adolescents and young adults, which is the smallest age group here.”

“So, wait twenty years is your response,” said Sarah.

John nodded. “But even then we’ll have maybe twenty thousand people with a few hundred adolescents and young adults, and all of them will be from reasonably stable, prosperous homes. We don’t have an alcohol or drug problem here because we’ve screened out most of those personalities. So how much crime will we have in twenty years? Practically none. We’ll still be the equivalent of a quiet, small town where everyone knows everyone else.”

“I think we can make more of a claim than that,” replied Greg. “First of all, there are the election customs. Second, we have a diverse society that has no clearly discriminated group.”

“How about new arrivals?” asked Sarah.

“I concede, the first four years are rough, but salaries keep going up and seniority improves. If you want people to stay, they have to see a steady improvement in their situation.”

“That’s true, but aren’t we losing people because they can’t take the pressure?” persisted Sarah.

“Sometimes,” agreed John. He pointed to the dessert buffet. “We had better get our desserts. Will Elliott will be speaking in a few minutes.”

The others nodded. They finished their various meals and went to get ice cream, cake, or fruit salad; the Gallerie now had four eating establishments and all of them provided all-you-could-eat buffets that day, paid by the Commission. They were part way through the desserts when Will Elliott walked up to the podium. The food court was so large that two large video screens had been set up to broadcast a magnified image of him.

“It is customary, every columbiad, to have a welcoming dinner where the commander or commissioner gives an address defining the direction we plan to take over the next twenty-six months,” Will began. “It’s like the American state of the union address. This is the tenth one delivered on Mars. It is helpful to start with where we are. As of this sol, Mars has 1,553 people, 190 of whom are children. All the outposts have grown: Cassini has 175, Dawes 140, Meridiani 80, Thymiamata 60, Phobos 65, and Aram 50, leaving Aurorae with 993. In a few months Mars will receive another group of arrivals, twenty-four Chinese who will establish a nuclear research reservation at Dawes. We are projecting the birth of about 330 children in the next twenty-six months, which means that the next round of arrivals will be greeted by 1,900 people.

“In the last two weeks since arrival, the Commission has made a series of decisions based on projected revenues. Our gold and platinum-group metals will return substantially more than anticipated, and many of the pledges gathered earlier this year will be honored in spite of the Earth’s grave crises. As a result, we anticipate flying three

ships from Mars to Earth in 2060 and flying them back here with 150 people each. Furthermore, two ships will fly here from Earth and return in 2061, and they will also have 150 arrivals each. Consequently, the thirteenth columbiad will bring 750 people here. When you add the 550 births we can project for 2061-62, the columbiad will add over a thousand people to our population. That is how fast Mars is growing.

“Rapid growth needs to be sustained as long as is practical because this world has a great future, but the immediate future of humanity appears to be growing darker. Mars may have to ride out massive economic and social dislocations on Earth, crises that could deny us some of our high technology imports, crises that are likely to make our gold and platinum more valuable. As we grow we can support ourselves better, can make a bigger impact on exploration and science, and our social and cultural values will have a greater impact on the home world.

“What are our priorities in the next twenty-six months? An obvious, new priority is safety. Mars has been touched by the terrorism that has disrupted Earth and brought it great tragedy. We must institute new mechanisms to protect ourselves from a repeat of the crisis we experienced two weeks ago. Tomorrow I will announce the formation of an independent commission to determine why our screening mechanisms failed. We have a remarkable population here; the cream of the crop; the best Earth can offer. But our screening process appears to have let one bad apple through and the consequences for us were potentially fatal. A trial will be held to determine whether a crime was committed and we must wait for its verdict. But meanwhile, we can check our application and screening processes.

“Beyond that simple step, we will be convening a second commission to determine how we can protect ourselves better from terrorism, especially sabotage of our environmental management mechanisms. The Emergency Corps we have been forming will have to add new skills to its list. Some of the changes may sadden us. The sol may come when we have to pass through metal detectors to board shuttles and sunwings and to enter certain restricted areas.

“Beyond safety, we have to continue our massive expansion of facilities. The children and new immigrants together will require one hundred twenty thousand square meters of polder and fifty thousand square meters of new housing and work space. Construction must continue to be privatized in order to achieve this unprecedented expansion. Construction will remain the single largest sector of our economy and employment. New robots and autonomously operating machines should greatly increase our efficiency in preparing the ground and driving the pilings for domes. Agriculture will expand accordingly to feed everyone; power production, water production, and other infrastructure improvements are planned.

“Employing our growing population is another challenge. Cassini will be opening the Muller Campus of Martech, dedicated to ecological research and Martian ore geology. Dawes will acquire the Chinese nuclear research reservation and an enlarged spaceport. Martech’s main campus at Aurorae will add a Department of Nuclear Science, providing the new experts at the New Hanford Nuclear Research Reservation an academic address. The number of personnel doing research on an aspect of Martian science, or providing technical support to them, will increase to 150. The production of caravels, which was scheduled to increase to four, has been cut back to three because of

other demands. The spacecraft will go to NASA, the Chinese Space Agency, and a private hotel in low earth orbit respectively. A fourth caravel completed a few months ago for the Venus-Mercury Commission will be used as our third transport for arrivals, and then will fly to Venus.

“But the largest increase in employment, other than construction, will come in the production of gold and platinum-group metals. The Martian regolith is about two percent nickel-iron fragments; the outer ten meters of regolith alone could yield 200,000 tonnes of nickel-iron per square kilometer, which in turn could produce about eight tonnes of platinum-group metals. Noachian floods have concentrated the nickel-iron for us. We could export a thousand tonnes of PGMs to Earth per year before the price dropped significantly, and right now PGMs average fifty million redbacks per tonne. With our large infrastructure, our capacity to manufacture solar and wind power facilities, our projected nuclear reactors at Aurorae and Dawes, our growing fleet of solar sailing craft, and our construction capacity, we are now in the position to make a massive commitment to platinum group metals, and they hold the potential to employ us and pay for this world’s development. PGMs will also provide the economic rationale for establishing more boroughs and distributing our population across Mars more equitably.

“Our final challenge is not economic, but social and cultural: we must develop a new kind of human community on Mars. During this columbiad and the next, Martech will be establishing a multidisciplinary ‘Program in Humane Community,’ which will have as its purpose to research and implement strategies for making life here more humane. We don’t know what that means, but we intend to find out. The program will also sponsor seminars, make policy recommendations, and give grants. It will become the

permanent sponsor of our 'Living Well' conferences. We hope that Martech can emerge as a center for the study of community and make major contributions to the reconstruction of terrestrial society.

“In conclusion, friends, Mars again finds itself at a new and exciting crossroads. The terrible tragedies sweeping Earth challenge us to find new ways to support ourselves, increase the future potential of this world, and contribute to the stabilization and development of our species' home planet. These tasks call on all our capacities: our creativity, our hard work, our collaboration, and our ability to love one another. Creativity alone will not solve our problems. Hard work, if dissipated on too many disparate goals, will achieve little. Collaboration will remain hollow and of limited effectiveness without affection and trust. So the ancient human values of affection, solidarity, unity, and love remain the key to our success. The time has come for humanity to develop its ancient and perennial sources of strength as well as its new discoveries. Mars must be in the forefront of both. Thank you.”

## Looking to the Future

late August 2059

Will Elliott's face filled the screen in the great room of the *Giovanni Piazzi*. Occasionally the crew would see him from an angle that revealed a bit of audience, or there would be a cutaway to the audience; then everyone scanned the faces to see friends and loved ones. Helmut and Clara Langlais were particularly pleased to see a glimpse of Sebastian Langlais, Helmut's dad; Kristoff, his older brother; and Kristoff's wife of one year, Irma. "Hey, there's grandpa!" exclaimed Charlie.

"That's right," exclaimed Clara. The youngest crewmember was almost six.

"It looks like they're eating lunch."

Yes, dear, the time at Aurorae is different." The crew of the *Piazzi* was just starting breakfast. Every since their landing on Ceres, they had shifted to a day of 27.225 hours, equal to exactly three Ceres rotations; that way after breakfast every "cere" they could go outside for 4.6 hours, come back in for a long, late lunch and a siesta, go back outside for 4.6 hours again starting in late afternoon, then return n for a late supper. It was a daily schedule similar to the siesta cultures of Spain and Portugal.

When Will Elliott finished, the Gallerie erupted in applause. Everyone on the *Piazzi* applauded as well. "Wow, Mars is changing a lot," said Zach Hersey. "We won't recognize the place where we get back."

"It'll be more than twice as large," agreed Commander Charles Vickers. "And I think the spirit of the place will be different. I don't like the commercial aspect. Note he said there are 1,300 adults on Mars and only 150 are devoted to Martian studies! What a

crazy statistic! Mars should have twice as many geologists, physicists, geochemists, eobiologists, and climatologists!”

“The rest provide the necessities of life,” replied Dharmapala. “Someone has to build the structures, grow the food, and make the clothes.”

“And all the little luxuries,” added Zach. “That’s another way Mars has changed, Charles, but I think we can all be grateful. We’re returning home to a more comfortable place to live.”

“I suppose,” agreed Charles. “I, for one, will want to go on another voyage.”

“Do you want to come back here?” asked Helmut. “There’s still plenty to do.”

“No, not here. I’d like to go to the Galileans, or maybe on an expedition to harvest PGMs from a near-Earth crossing asteroid.”

“Do you want to come back, Helmut?” asked Dharmapala, with a smile. Helmut’s enthusiasm for Ceres was famous on board.

“Sure; it’d be fascinating. We’ve had expeditions to almost every terrain type and major feature on Ceres, but there’s still a lot left to study, especially the interior. And there are a lot of intangibles; this place should develop winged sports, for example. The gravity is perfect for them.”

“I wonder whether an expedition will come back here any time soon?” wondered Dharmapala.

“I doubt it,” replied Charles. “There’s lots to do elsewhere in the Asteroid Belt, and not enough new to do here.”

“I don’t agree,” replied Helmut. “The gravity is low enough and the technology advanced enough to drill a shaft five hundred kilometers to the heart of Ceres. Think of

all we could learn about geological processes in general and processes unique to this environment. And this is the place to supply fuel and food all over the Belt; almost every asteroid is a low delta-v from here. We could manufacture simple water tanks, fill them, and send them to every asteroid slated for exploration in the next two decades.”

“Yes, but you just spent about a billion dollars a year,” said Charles. “You’d need two caravels and fifty personnel. I don’t know how that kind of funding could be found.”

“But shouldn’t we put together a report?” said Dharmapala. “We’ve now been here a year; we’ve completed all our primary mission goals; we have two months left. It’d be a good use of resources.”

“I second the suggestion,” said Helmut.

Charles looked around. The others seemed generally positive about the idea. “Alright, both of you have the assignment, and anyone else who wants to help. We should offer our ideas about the further exploration of this world. Start working on it now; generate ideas that could be added to our primary mission while we’re still here; prepare a report for release right after we head for Hebe.”

“Okay,” said Helmut, and Dharmapala nodded.

“Good.” Charles looked around. “A new cere, new assignments. Zach, your team has maintenance all over the ship.”

“We know; the main air purifiers in sector three are pretty cranky,” said Zach.

“But we’ll keep them going another sixteen months,” added Thierry.

“That’s all we need,” replied Charles. “Four years is a long time for this equipment, but with you guys on board I’d fly this ship to Saturn. Helmut, your team is

still analyzing the results of the Mount Sarasvati expedition, but I'd like you to prepare for a short trip to Frig Planitia this afternoon."

"We need to recover the drill samples there," Helmut said, nodding.

"Exactly. Dharmapala, your team should continue preparing for the trip to area 269; you're leaving in two cere. Sophie, the food supply is getting rather low."

"Production's a bit tight, but we won't have to dip into reserves."

"Good. Except I'm authorizing one dip into them: Jack, Fricere supper, give us some steak. We've been here a whole year, so it's time to celebrate. We only have two months left on Ceres; we need to treasure every cere we still have here. Okay, folks? Let's get to work."

The crew finished up their coffee and headed out. Charlie headed to his room, where Martha Vickers would teach him and her daughter, Caitlin. Clara headed to the bridge, where she was the day officer. Helmut headed to the science lab with the other geologists, who had various assignments analyzing samples or preparing to obtain more. "I really think an expedition has to come back here soon," he said to Dharmapala on his way to the geology lab. "This is not just any little asteroid; it's a planet!"

"You're right, it's almost intact from the beginning and it's partially differentiated, so it's unique. But Helmut, this is the asteroid belt, not Mars. This is an exploration zone, not a settlement zone. There won't be a community of people living here for a long time."

"Who says? A deep drilling project would yield pretty remarkable science. If we wanted to cover the costs of the expedition, we could send along an extra dozen people and a carbonyl fractionation tower to separate out platinum-group metals."

“PGMs? They’ve become a panacea!”

“Why not? The Ceres regolith is full of smashed nickel-iron meteorites! We’ve got plenty of local water and carbon.”

“And the current towers consume 32,000 tonnes of raw material per month, require several thousand kilowatts of power, mass over a hundred tonnes, and take a half dozen people to run, all to make a tonne of PGMs every other month and 300 million redbacks per year! The PGM separation process is barely profitable on Mars with the infrastructure to support it.”

“Well, that’s true. But it should get more efficient over time.”

“I’m skeptical. They’ve already spent several billion dollars improving the process.” They reached the science area. “Let’s get together this afternoon and start outlining the report.”

“Okay.” Helmut turned and walked to his work station across the room. He sat and opened his attaché. He had been working on a chemical analysis of the various “lavas”—mud-clay slurries—and ash flows that had erupted from the cryovolcano Mt. Sarasvati. The chemistry correlated with the seismic evidence that the mountain’s “magma” had come from a zone about one hundred fifty kilometers below the surface, when that area had been warm enough to have liquid water and steam about a billion years ago. He was more than half way through his part of the research that would produce a lengthy geological paper on Ceres volcanism; the manuscript was due in three weeks. But his mind was now focused on the question of why human beings should return to Ceres. It seemed a shame that the *Giovanni Piazzi* would leave in October and no one would return for years or decades. Ceres was nearly a thousand kilometers in diameter;

its surface area was equal to almost half the United States; most of its surface had seen eruptions of liquid water in its early years; its interior was extensively mineralized; there was even the possibility of subsurface life down a hundred kilometers, where temperatures and pressures still allowed liquid water. With a gravitational field just four percent as much as Earth, a human being could strap wings on his arms and fly inside a pressurized dome. With mirrors to reflect in additional sunlight, greenhouses could function on the surface. In short, there were a myriad of reasons for people to maintain their presence on Ceres. And the costs of space missions had dropped drastically in the last forty years; there was no need for a large mission control because the crew had to maintain everything themselves. While Earth might regard a mission to Ceres as too risky for humans, the Marsians had a better appreciation of the importance of human involvement.

But Mars didn't have money. The Asteroid Belt Commission was based there because the Marsians were willing to take the risks, but it was funded via nations on Earth.

There were only two ways to fund a Ceres mission: a very significant science objective, a very significant profit to be made, or a combination of both. The last seemed most likely, because either or both objectives could be weaker and the combination still would be justified. Helmut turned to the remote sensing data on Ceres to see what they knew about platinum-group metals. Satellites currently or formerly in orbit had mapped the surface to a scale of one meter or less. If there were any good lodes of nickel-iron, the data was already available.

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Paul Nuri and Jacaranda Chamberlain had a beautiful wedding. The Bahá'í gardens were overflowing with flowers, prompting many to stroll around before the ceremony and admire them. After the short ceremony ended, the couple posed for photographs for a few minutes. Then, with a violinist in the lead, the entire wedding party processed to a private meeting room in the Gallerie for the reception.

A grand buffet, a tall wedding cake, and dancing music greeted everyone. Two large screens and a videophone setup brought the terrestrial families of the bride and groom to the reception; Will went over to both right away, first to say hello to Molly, his mom, and Marshall, then to greet Jacaranda's family. By then there was a long line at the buffet table. Will sat with Ethel, Roger Anderson, Madhu Gupta-Anderson, Érico Lopes, and Carmen Segovia.

"I hate to make comparisons," said Ethel. "But times have changed immensely in the last twenty years, haven't they? Jacaranda has a beautiful wedding dress, the groom has a tuxedo, and the entire wedding party is dressed in matching dresses or tuxes."

Carmen laughed. "And we didn't even have wedding dresses!"

Ethel laughed as well. "Exactly! Not to mention a fancy hall like this, all sorts of delicious foods, a wide array of choices for wedding presents. . . it's incredible."

"Don't forget we invited everyone on Mars," added Will. "You can't do that now."

"Ah, we sound like old fogies," growled Roger.

"Roger, we *are* old fogies," replied Érico. "The six of us are the entire founding members of Marsian society who still reside on Big Red, minus Shinji."

“And here we are, five children amongst us, one of whom is out of the nest and the remaining four will be in a matter of a few years,” said Will.

“Sammie’s moving into an apartment dorm next year,” added Madhu.

“Corazon’s got just a bit over a year left, like Lizzie,” agreed Carmen. “Of course, we’ll have Paolo at home another seven years.”

“How are Corazon’s career plans going?” asked Ethel.

Carmen shrugged. “Her math and science are strong and she has a mechanical aptitude. I just hope she finds an engineering field she likes.”

“At least it’s practical,” replied Ethel. “Liz really wants to be a ballerina, but we won’t have professional ballerinas here for some time and she can’t go back to Earth. She’d have to retrain all her reflexes.”

“And compete against some very talented dancers,” added Will. “She’s good in the humanities; she needs to consider a career in history or literature. We don’t have enough experts in those fields.”

“Sammie’s pursuing geology,” said Roger. “And so far, after a year at Martech, he seems to like it.”

“How’s Marshall doing?” asked Carmen.

“Pretty well,” replied Will. “MIT’s spring semester finally ended in mid July, after the delays because of the pandemic, and he has used the month since well, learning to drive my sister’s car in Connecticut. So he has something no young man in the mid-twenty-first century United States can do without: a driver’s license!”

“You should hear him talk. He has replaced his Marsian accent with an American accent!” added Ethel. “And he has a girlfriend.”

“I’m not sure how our so-called Marsian accent evolved anyway,” exclaimed Roger. “I guess Fatima Hijazi taught it to her students.”

“Well, with a Scottish mother and an American father, Marshall never had an American accent anyway,” said Ethel.

“Sammie feels really torn when he hears from Marshall,” noted Madhu. She glanced at her son, who sat at a nearby table, flirting with Corazon. He was tall, black-haired like his mom, and 18 ½. “He’s jealous that Marshall went to Earth and misses him, but he’s fundamentally afraid of the place. The pandemic has made that worse.”

“We’re torn about him going to Earth, too,” added Roger. “I’m glad he’s staying here. There’s really nothing he needs that he can’t get here.”

“Yeah,” agreed Will. “Marshall saw someone mugged on the Boston subway. But MIT is proving to be a good fit for him. He’s made some very good friends, and he’s active with the Bahá’ís. But I suppose there isn’t anything essential he’s learning there.”

“He’s getting a sense of what the mother world is like,” said Ethel. “That’s valuable. But considering how dangerous Earth is right now, I’m not sure it’s worth it!”

“It makes me wonder whether I should go back on business next columbiad,” exclaimed Érico. “But I suppose there’s a lot of support for Marsian autonomy that can be gained if I do.”

Will nodded vigorously. “It’ll be worth it, Érico. There are a lot of people on earth sympathetic to the idea of Marsian autonomy or semi-autonomy. A lot of politicians will want to meet you and get a sense of who it is that’s running the place.”

“If I’ll still be running the Commonwealth Authority. I’m a geophysicist, Will, and I’d like to get a chance to do geophysics again. There are a lot of others who can run the Commonwealth quite well.”

“Whoever is in charge in 2061 should go back to Earth,” persisted Will. “Every other columbiad the chief minister or a representative of the Authority should go back, make a whirlwind tour, and give a hundred speeches. . . it’s a pain, but it’s part of the process.”

“Assuming there’s an Earth to go back to,” said Roger. “With the election in Khaliestan coming up, and the likelihood the winner will be the anti-American candidate, there’s the potential for a huge mess.”

“I agree. I doubt the Earth will fall into so much chaos that we won’t be able to trade with it. If that happened, we’d be in serious trouble, because Mars can’t be technologically self sufficient. We’d need hundreds of thousands of people to be able to survive on our own.”

“I doubt we’ll have to go it alone,” agreed Érico. “But Earth’s reaching a critical juncture. In every large country there’s a substantial population that wants real independence and rejects any international system where the world tells them what to do. Of course, the people in the little countries have had to deal with limited sovereignty for decades or centuries, but they can’t help the people in the big countries get over that. So the Earth is unable to make major decisions.”

“I think it’s more serious even than that,” replied Will. “The very ability to make essential decisions is eroding because of partisanship. No one considers what is the best for their country any more, let alone what’s best for the world. They want to know what

will help them gain and keep power. If that means pandering to xenophobia, or playing one ethnic group against another, they'll do it."

"Where will it end?" asked Madhu.

Will shook his head. "With a lot of suffering. That's all we can be sure of."

"Let's hope Mars can avoid it," added Roger.

"I'm worried about that," said Érico. "We're developing social tensions up here over income disparities. Resentment is building."

"If people have a comfortable living right after they arrive, they can't advance and they won't sacrifice," replied Roger. "People who stay twenty years should earn substantially more money than new arrivals. Even with our 'big' salaries no one is as comfortable as the middle class in the United States or Europe."

"Come on, Roger," replied Érico. "No one expects to be as comfortable as on Earth, but right now Mars is financial hell for new arrivals. Between mortgage payments and food, people at the bottom of the income scale have nothing left. People arrive with a few months of salary from the flight out—which isn't much for the shorter flights—and immediately plunge into a huge debt buying necessary furniture for their place, then can't pay off the debt."

"People always complain, and they still feel they have to spend 25 redbacks for the imported terrestrial Java bean latte they buy at Starr's every morning," replied Roger.

"True enough; but the *birth rate* stands at 1.6 children per couple," persisted Érico. "Even with the new 'Geminale' fertility drug that practically guarantees twins, it has barely gone up. We really need to get the birth rate up to 2.0, and that'll never happen when people have to struggle so much."

“Birth rates are under 2.0 in most of the developed world, so I don’t know how we’ll get it up,” commented Carmen.

“Import more Nigerians and Mormons,” quipped Madhu.

“Even with Paul’s augmented salary from two completed years of work here and Jacaranda’s savings, they’re struggling to pay the mortgage on their 75 square meter flat,” agreed Will. “And Jacqui’s been staying with us for two weeks. Paul moved in with us for most of last year after Marshall left, so he was able to save. It has gotten very difficult to make ends meet here.”

“We have no one willing to gut chickens and clean fish, even for 300 redbacks an hour!” exclaimed Roger. “Robots still don’t do a very good job, either.”

“That’s true,” agreed Érico. “A lot of people who fly here figure they’re now a member of a pretty exclusive group and shouldn’t need to get their hands dirty.”

“Well, someone has to do the dirty work,” agreed Will. “Lord knows, I’ve killed and cleaned a few animals in my time. We have to fly out more people willing to do that kind of work.”

“They say they’re willing, then once they get here they do everything in their power to get reassigned,” replied Roger.

“Even so, Will, isn’t there something we can do to make the situation for new arrivals better?” asked Érico. “Granted, our salary range is relatively flat; the Commissioner earns only 5.3 times as much as a new arrival. But the problem at the bottom remains. The base salary of 200,000 redbacks per year is impossibly low.”

“Well. . . maybe we can look into the matter, Érico, but the fact remains that people can raise the 200,000 redback salary many ways; they can do overtime, get

training to serve various functions in the Emergency Corps, gut chickens. . . so I'm not too sympathetic. We need certain undesirable tasks done and we need economic incentives to get them done. The base salary is only paid to people who arrive without Ph.Ds. and includes free tuition to attend Martech and improve their education. That's a pretty valuable benefit. Furthermore, a big part of the problem is the need of arrivals to buy everything for the first time: housing, furniture, appliances. That problem solves itself with a good mortgage and time."

"True enough," said Érico, scowling. He particularly scowled at Roger; he had the feeling that if his old nemesis on social issues hadn't been present, he might have swayed Will further. "Will, I've heard complaints about your new mansion. I just thought you should know."

"I've felt the resentment as well. I decided to build it after turning down an offer by the Commission to build me an even bigger house at their expense. We used only a fraction of our savings—which has accumulated quite a lot over twenty-three years—the contract stimulated the creation of Afigbo Construction, and the need for new materials to complete our house improved the diversity of the materials used in everyone's houses. The investment was well worth it at several levels."

"Perhaps, but these are the classic arguments of the rich, and they don't assuage the resentment very much."

"You're on a real campaign, aren't you! Érico, we'll probably donate our house to the Mars Authority in our wills; that is, if it's worth donating, because by then others will probably have even grander domiciles! Silvio earns more than I do through the store and

the bank. The Mormons, even the Nigerians, will soon have some rich people in their midst. We have a range of incomes on Mars and that won't go away."

"Earth tried flat income ranges in various Communist societies and it was a failure," added Roger. "I'd like to see us learn from Earth's mistakes rather than repeat them."

"Well, one of Earth's failures we need to learn from is the failure to eliminate poverty," replied Érico. "Don't forget that."

"That's true," agreed Will. "But we don't have abject poverty here, either."

"What we have achieved, so far, is pretty remarkable," exclaimed Ethel. "We have financial difficulties and affluence, but the range is less than on Earth. I think our real achievement is political; we have a civil society that is actually fairly civil."

"Yes and no," replied Érico. "The political process is not that bad here, but it's still incredibly difficult to bring about consensus even among intelligent and reasonable people!"

"Will, I don't know how you do it," added Roger.

"I suppose I am too patient with people."

"I hope you aren't planning to retire any time soon," said Érico.

"Well, I'm three years into my second five-year term, so I have at least two years left. They said in 2051 that the Commissioner position would involve no more than two five-year terms, but I've already been hearing hints they might approve a third term if I want it." He looked at Ethel. "In some ways I feel like you, Érico; I'm tired of dealing with all the craziness. But I also have this feeling that there's more I can do as Commissioner. I'll be sixty when my second term expires, sixty-five when a third term

would end. That would be a good time to retire. And even when I retire, there will be plenty for me to do up here, especially making sure our government is run by consensus and with the needs of all humanity and Mars in mind.”

“That’s the sort of role a ‘senior statesmen’ can play,” agreed Ethel. “Especially one that likes to cook and entertain, like you do, dear.”

“Hey, I’m counting on you to write some geology articles with me,” said Roger.

“You can count on it,” replied Will.

“Enough of the talking,” said Madhu, standing. “I want to get one of those imported Java-bean lattes, I have to pay my respects to the family and the couple, and then there’s the dancing.”

## The Prize

Sept. 2059

The sun shone brightly into Cathay dome, slanting in from the east and bouncing off the aluminized blanket still covering the western side of the dome, producing a double illumination on the buildings and vegetation below. Will Elliott tried to walk around the entire outpost at least once every other sol; not only did he need the exercise, but there were always little problems he spotted, such as a stuck irrigation valve leaking water or a tree with a broken branch needing to be removed.

Cathay was new and therefore was a favorite of his. Seventy meters wide and two hundred meters long, the southern or uphill end was now densely urbanized; the northern half was intensely cultivated, and there was no plan to urbanize it in the next few years. The design of the urban space was quite simple: two parallel rows of buildings twenty meters wide with a twenty-meter park in between. The buildings were separated from the dome walls by alleys five meters wide. The central park space, termed “the Riverwalk,” had a four-meter brook meandering through it and a four-meter walkway; the brook connected pools and had a few small waterfalls, while the walkway connected building entrances and patios. The rest of the central space was landscaped with vegetation typical of south China. The building façades had a Chinese design, with fake tile roofs. The only incongruous part of the design was the fact that the buildings abruptly ended at a vegetable garden. Otherwise, the Chinese design gave the space charm and beauty.

At the end of the buildings, where the farmland began, a road crossed the dome. Will turned left and took the tunnel through to Punjab Dome, which was also two

hundred meters long and seventy wide. The southern half was all foundations and building bubbles, with steel structure going up both inside and outside the airtight kevlar and nomex enclosure, and sheetrock wall panels being bolted in place to make the interior walls. The entire area was a mess of machines, piles of building materials, and heaps of debris.

Will picked his way carefully through the middle of the construction zone, waving and stopping to talk to a few of the workers. The construction was on schedule; Punjab and the next dome to the east, Zanzibar, would both house about three hundred people in two years time.

At the southern end of the dome Will turned left and took a five-meter wide tunnel back to Cathay. The space between the domes was fifty meters wide. Ten meters down, a cart packed with building materials temporarily blocked the tunnel; Simeon Afigbo was supervising the effort to turn the huge, heavily laden cart into an airlock leading to a corridor on the left. When he saw Elliott, he waved. “Good morning, Commissioner Will! Wait a minute, I want to show you my solution to the problem of open space!”

Will waited while the long, narrow trailer turned the corner and was pushed by hand down the corridor by Simeon and his assistant. It had a tonne or more of sheet rock and PVC pipe packed tightly into the small space. They rolled the length of one twenty-meter module, through a sixteen-meter tube rendered claustrophobic by the cart and then across a four-meter long garden bright from daylight; then through another airlock and into a new enclosure that was under construction. Half way down they stopped in a patio

space just four meters wide, where one of Simeon's workers grabbed his end of the cart and pushed it into the work area.

"You have a row of four enclosures finished," observed Will.

"Yes, they've all sold. But this enclosure has a different design. I've divided it into three sections, eight, four, and eight meters each. I can move the four meter garden around if I want larger or smaller units; our architect in Lagos has already produced four floor plans. Remember the borough was asking us to leave one third of each enclosure as open space, or provide empty enclosures for park space? Well, we all agreed that an occasional park module really wouldn't be very helpful; people would walk through them, but probably not use them much. The issue is providing people with some *personal* open space. So what we are planning to do is install a transparent plexiglass floor over this open space so that the second story can use it as well, and create some second story patios. The borough accepted that design modification."

"Oh." Will looked up. He could see steel beams projecting across the open space where the plexiglass panels would eventually be installed. "Well, why not? People on the top level will be able to walk across, stand and chat, and kids can run around."

"And people can put down a little rug under a chair if they find a transparent floor a little frightening. They can put potted plants up there; too; if we supplement natural sunlight with some grow light LED panels, first floor won't have any reduction in sunlight. We're also installing grow light LEDs along the edges of the top story so that the two meters on either side of the apartment, where the ceiling is less than half a meter high, can have flowers and grass, and floor-level windows opening onto them."

“Excellent. Well, good luck, Simeon. So, you’re not going to include any empty enclosures in your development?”

“We’re not sure. Maybe every three rows—every twelve enclosures—will have one empty enclosure, as a condominium meeting space.”

“I think that’s excellent. These partially buried units will inevitably feel closed in and dark compared to housing in the domes. I think the borough’s advice about open space is good, Simeon.”

“I know; it’s just expensive!”

Will laughed. “Yes, it is. Have a good sol, my friend.”

Will exited Simeon’s building site and walked back into the main tunnel. He crossed Cathay and Andalus on his way to his office. Before he reached his office, though, his attaché beeped. He picked it up from his belt and opened it, which was enough to activate the call. It was Ethel. “Will, did you hear? They just announced the winner of the Nobel Prize for Biology: Enlai Tang!”

“Really? Wow! I’ll have to congratulate him.”

“It’s impossible to call him; I just tried. The statement said that his work on Martian eobiology and on Martian feral lifeforms had led to breakthroughs in our understanding of the origin of life. It’s really very exciting.”

“Yes. Our first Martian Nobel Prize! And he’s President of Martech as well. That’s prestigious for the university as well as Mars!”

“It is. We can all be so proud of him.”

“Thanks for letting me know. I’ll go to his office right now. Bye.”

“Bye.” Ethel closed the circuit, so Will folded up his attaché and headed for Catalina Biome, whistling as he went. He entered the Catalina South Building and headed to Enlai’s office. There was a din of conversation in the hall. The entire university faculty had converged on his office and was crowded in the hall outside, talking. Enlai was chatting, accepting congratulations, then dashing in to answer the videophone or respond to interview questions as they trickled in from Earth.

“It’s about time you got here!” exclaimed Roger when he saw Will.

“I came as soon as I heard.”

“No one’s going to get any work done today, that’s for sure!”

“This is big. We’ll have to plan a special reception.”

Just then Enlai came out of his office. He saw Will.

“Enlai, I am so happy,” Will said.

“Thank you, I’m overwhelmed!”

“I can imagine. Did you have any idea this was coming?”

“No, of course not! The Nobel Committee called me three hours ago. Of course, they asked whether I could come to the ceremony, and I laughed! They have no idea how transportation between planets works.”

“I’m surprised.”

“They’re biologists and bureaucrats. I’ll have to accept the prize via videolink.”

“This is so exciting for everyone, Enlai. And it’s an endorsement of your leadership; of our exobiology program and of our university.”

“Thank you. I have no idea whether I’ll have time to lead either for a while! I’m being interviewed by five different journalists simultaneously right now! I have trouble remember who has already asked me what!”

Will laughed. “Well, enjoy the attention. And just think, you may have more discoveries ahead.”

“Yes, if the flight to the Galileans happens. Thanks, Will.”

“I hope you’ll still be able to go to Dawes with me in two weeks.”

“Oh, I’m sure! This should blow over by then.”

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Silvio Diponte entered the anteroom leading to Robert Kampala’s cell. The door shut behind him and he heard it latch. Locked. It was an ominous sound that echoed in the chamber.

In front of him were two cells, each with nickel-steel bars from floor to ceiling, separated from each other by a nickel-steel plate, with nickel-steel plating for the walls and ceilings as well. Robert had a three by four meter rectangle to himself, with a mattress on the floor and a plastic chair to sit on. A few possessions were lined up against a wall. In one rear corner was a shower head in the ceiling with a drain in the floor below. A plastic toilet and a plastic sink completed the cell. In the anteroom was a television screen, a table, and two chairs. Silvio grabbed a chair and pulled it over to the bars.

“Good afternoon, Robert.”

“Afternoon, Silvio.” Kampala was lying on his mattress, wearing pajamas—that’s all he was allowed—staring at the ceiling. After two months in confinement he had gotten flabby.

“How are you today?”

Robert shrugged and didn't say anything at first. “Nothing new.”

“Well, I have some news for you.”

“The trial date?” He almost sounded interested, though he didn't move.

“Yes. The evidence is gathered and organized. There really wasn't much that needed to be done; the vial proved to be flu virus. We're working on a method to fly it to Earth at a high speed via Mercury. We can get it there in about six months even though the planetary alignment is adverse, though at a pretty high cost. The authorities on Earth want it for analysis.”

Robert said nothing. He had been interrogated daily by Kent Bytown and Yuri Severin for two months and had not said anything at all. This in spite of bombardment by all sorts of television programs for several hours every day, designed to wear him down, and programs offensive to his taste. He hated violin music; he had been repeatedly subjected to concert after concert.

“We've got the video of your sneaking into the environmental management facility and of your resisting arrest, video proof the vial was there, and the RNA analysis confirms it was the same flu strain that killed sixty million people on Earth. Your lawyer has all of this evidence; perhaps he's already reviewed it with you. We think the trial will start December 15; a bit over two months from now. It'll take maybe five sols. Your defense attorney will repeat all of this. I'll be the judge at the trial. My job will be to make sure the trial is fair and that the jury understands the charges, the evidence, and the potential penalties. I thought I should come tell you that the death penalty has been approved by the Mars Council. It met last night in special session to deliberate about the

penalties that should apply when attempted terrorism and mass murder are involved. It was quite a debate.”

Silvio didn't mention the bitterness of the debate. Robert turned to look at him. For once, Silvio could see he had the man's attention. He let the words linger, to see whether Robert would speak, but he didn't.

“Furthermore, this morning I received a communication from the Attorney General of the State of Texas. Our laws are subject to the interpretation of the courts in Texas because we aren't a sovereign entity and because the Commission is headquartered in Houston. The attorney general informed me that his office had approved our decision. Furthermore, he reported that the Attorney General of the United States of America had called him and said that since you weren't providing any information or cooperating in the least bit, the government of the United States would not oppose the death penalty and might not seek your extradition to the U.S.”

That startled Robert. Silvio sat and looked at the wall, poker-faced. “We're looking into ways of carrying out executions. We won't toss anyone out an airlock. Lethal injection is probably the most humane. We could also use carbon monoxide. If the verdict is guilty, there will be a period of time while the sentence is under review; until any verdict is rendered, you are presumed innocent. It is not likely that the review period will last very long if the evidence proves strong.”

“This is ridiculous; how can anyone execute Mozart!”

It was the first outburst from Robert they had seen in a month. Silvio rose. “Well, as the Judge of the First Circuit Court of Mars, I am here to assure you that we can execute Mozart. The law is very clear. If someone is found guilty of attempting mass

murder and does not cooperate, the person will be executed. On the other hand, if the person cooperates, the sentence can be reduced, possibly quite a bit. It's something to think about."

Silvio turned and headed to the door. As he reached it the latch clicked so he could step out. He looked back. Robert was watching him and looked startled.

Silvio closed the door behind him. Kent Bytown and Yuri Severin were both sitting in the control room, watching Robert on the monitor. "Thanks, Silvio. You seem to have reached him," said Yuri.

"I hope so. He seems to have listened a little."

"You got more of a reaction from him than we have," added Kent. "We'll leave him alone the rest of the sol. No offensive video. Maybe we'll even give him some soothing music at suppertime as a reward for listening."

"He's tough." Silvio shook his head.

"We Marsians are tough too," replied Yuri. "No terrorism here."

"Absolutely," agreed Kent. He paused. "I favor carbon monoxide over lethal injection, myself. We fear for our air."

Silvio considered the remark for a moment. "We'll see. You probably heard the hundreds of raging debates about the Council's decision in the Gallerie this morning: whether execution is punishment or vengeance, whether life imprisonment is more humane or a waste of our scarce resources, whether we should bite the bullet and deal with him as a mature society or just ship him back to Earth. . . whatever the result of those debates, we can't act out of emotion, but principle."

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Helmut stood on the top of the *Giovanni Piazzi* looked out at Ceres. The caravel had landed, fifteen months earlier, on the western edge of a pitted plain near the border with the equatorial highlands. Ten kilometers to the south, the cryovolcano Mount Astarte rose into the sky; its peak poked above the horizon. To the west, the plain ended at the ejecta blanket of the crater Haravati; it formed a low range of hills on the horizon eight kilometers distant. The sun was low over the hills and would set in another hour.

“It’s pretty, in its own way,” he said to Dharmapala and Charles, who were standing with him. The three of them had secured the last equipment on the outer hull of the ship.

“It is,” agreed Dharmapala. “This has been a fascinating world to visit; better than I had ever expected.”

“I agree,” said Charles. “And if Helmut has anything to say about it, an expedition will be back!”

“Hey, I’m not a Ceres fanatic! This is the largest world in the belt, a central one, rich in diverse resources. . . pretty significant.”

Charles put his gloved hand on Helmut’s shoulder. “You’re not a Ceres fanatic, just a Ceres lover, and there’s nothing wrong with that. Mars has a lover: Will Elliott. If it weren’t for him, we’d be a decade behind where we are today. Mercury doesn’t have a lover and it’s way behind Mars and the moon. Ceres needs an advocate and a lobbyist.”

“I guess I’m that.”

“Of course you are. You’ve found an exposure of ataxite meteorite with ten times the nickel and platinum content of the average nickel-iron body, so you can argue an

economic basis for exploration. And the deep drilling project jazzes up the potential science return. You might be able to make a case for a return mission.”

“Do you really think so? I’m biased.”

Charles hesitated to reevaluate his own feelings. ‘Well, we’re all biased; I like this place too. It’s not just a rock. The economic and scientific bases of exploration are probably weak, considering the terrestrial depression and political instability. But people will be back, and your work has hastened that date.”

“Thanks.”

“We still have a lot of data analysis to do,” added Dharmapala. “Especially the seismic data. Transmitting it all to the supercomputers on Earth will take days.”

“And the seismic network gathers more all the time,” added Helmut.

“I’ll assign both of you to Ceres data analysis on the flight to Hebe. Helmut, except when we’re on Hebe and Flora, I can assign you to further analysis of the Ceres data, if you want.”

“Oh, thank you! I’d really appreciate it.”

“Well, Ceres *needs* a lover.” He turned. “Let’s get inside. Blast off is in two hours and we have a lot to do.”

Will Elliott, Enlai Tang, and Brian Stark passed through the pressure tunnel and into the jetwing. They were the only three passengers for the twice-weekly flight connecting Mars's outposts. They sat in the front of the passenger cabin; the rear six meters was filled with three tonnes of cargo bound for Dawes.

The jetwing fired up its three turbojet engines, pulling in Martian air and burning it with cryogenic silane pumped from the wing tanks. The pilot and copilot turned the jet and headed for the runway. At the beginning of the runway they added onboard liquid carbon dioxide to the engines, increasing the power output five fold. The passengers were pressed into their seats powerfully by the acceleration. The two silane-carbon dioxide rocket engines on the bottom of the fuselage fired, lifting the jetwing into the air before it had rolled more than a hundred meters down the runway. The turbojet engines doubled their power output again and the passengers felt nearly one gee of force pushing them backwards into their seats. The aircraft rapidly accelerated and gained altitude. The pilots pulled in the flaps, converting wide takeoff wings into narrower supersonic fight wings. They were airborne and flying at 1,500 kilometers per hour in two minutes.

While on any particular sol the jetwing could hop from Aurorae to Aram, Thymiamata, Meridiani, Dawes, and Cassini, then back, that sol the jetwing was flying straight to Dawes, 4,563 kilometers and five time zones east of Aurorae Outpost. Two hours and forty-five minutes after takeoff, the jetwing began to slow, descend towards Dawes airport, and extend its wing flaps. It was soon skimming less than a hundred

meters above the ground at 800 kilometers per hour. The pilots activated the underbelly rocket engines to support the aircraft's weight and reversed the turbojet engines. The jetwing slowed, settled toward the runway, and a minute later touched down at about 250 kilometers per hour. The rockets fell silent and the turbojets cut back to slow the aircraft gradually. Once it stopped, a conestoga drove up, a docking tunnel was connected to the aircraft, and the three of them transferred out.

"Ah, there are the domes," said Will as the conestoga climbed over a low ridge and began to descend toward the outpost. Dawes had two old domes, Orinoco and Kenai, each fifty meters in diameter; dwarfing them was a complex of three new cylindrical domes seventy, two hundred, and seventy meters long respectively. They were all seventy meters wide.

"Pretty big," said Brian.

"Not quite big enough," replied Will. "Dawes is rated for 180 residents, but the Chinese crew pushes them to 188."

"Should have put the Chinese in Aurorae," replied Brian.

"Well, they're here, where you can't spy on them and vice versa," replied Will.

"Brian, we're here to establish good relations. Your two teams have a lot in common and may even find some areas of mutually beneficial cooperation."

"On nonclassified research, of course," added Enlai. "Relations between our two countries are deteriorating on Earth, but we can maintain cordial relations here."

"Perhaps," replied Brian, skeptically.

The conestoga drove into an airlock attached to Orinoco Dome. In a few minutes it was pressurized and they drove into the garage. Feodor Velikovsky, Chief Minister of the Borough of Dawes, stood to greet them as they stepped out.

“Welcome, welcome to Dawes,” he said. He stepped forward. “Commissioner Will, it’s good to see you here again.”

“It’s been a long time,” replied Will, shaking Feodor’s hand. “We were admiring your new cylinder domes.”

“Deadwood North, Central and South, named after the gold mining town in South Dakota. They’re fantastic for agriculture and a place to walk around.” He turned to Enlai. “Dr. Tang, welcome to Dawes, and congratulations winning the Nobel Prize.”

“Thank you; you’re very kind,” replied Enlai, as they shook hands. “The shock is finally wearing off.”

“Dr. Stark, welcome,” added Velikovsky. They shook hands as well. “This is your first visit, right?”

“Correct. I’m happy to see your facility.”

“Gentlemen, let me show you to your rooms. The shuttle *Nirgal’s* first aerobraking maneuver went well, so the second maneuver, followed by landing, is on schedule for two hours from now. Will, I was hoping that we could sit and talk about some of the developments here.”

“Sure. How are the plans for the reception?”

“We’re combining the reception with the welcoming dinner tonight, if you don’t mind.”

Will was startled. “No, the public dinner and the private reception are two different things. The three of us have come all the way here to welcome the Chinese nuclear engineering team to Mars and protocol dictates a warm, hospitable welcoming reception, followed by a big dinner.”

Feodor glanced at his watch. “Ah. I see what you’re saying. I can ask the cooks to shift priorities.”

Will glanced at his watch; it was 11 a.m. in Dawes, which meant the kitchen staff was working hard to get lunch on the table for 164 hungry people. He looked at Enlai. “If I remember from over a decade ago, you’re not a bad cook.”

“I think I can keep up with you,” replied Enlai, seeing where Will’s thought was going.

“Can’t we skip the reception?” said Brian.

Will shook his head. “No; how are you at cooking? Oh, never mind, I’ve seen your flat.”

“I suppose I can help.”

“Will, I can reassign the cooks,” said Feodor. “You don’t have to do this.”

“Feodor, he’s a gourmet cook,” replied Enlai. “If you have the ingredients, I know how to make some pretty good, simple, Chinese hors d’oeuvres, too.”

“I’ll show you to the kitchen,” replied Feodor, reluctantly.

“Thank you,” said Will. “Oh, and Feodor: I bet you had a grandmother who was incredibly generous and hospitable when she had guests over to her house.”

“Oh, yes, grandma Ivana was legendary with her heaps of food and her pastries.”

“And a big samovar for tea?”

“Of course.”

“That’s what I thought. Just remember that Marsian hospitality is like your grandmother’s.”

“Right. . . I apologize, Will.”

Will nodded an acceptance. Feodor led Will and Enlai out of the garage, Brian Stark trailing reluctantly behind.

They took over a corner of the kitchen, surveyed the supplies—which were fairly ample and diverse—and got to work. Fortunately, some of the lunch menu was suitable for the reception, so they concentrated on making a few special desserts. Brian helped as best he could, finding supplies and handing them to robotic assistants. Will and Enlai took time out of the kitchen to direct the preparation of the reception room, setting up a large Chinese flag on the wall, arraying the Marsian, American, Russian, European, and other flags together near it, covering the tables with the only nice tablecloths at the outpost, and setting them up with flowers and symmetrically arrayed plates and silverware. They worked feverishly against the deadline.

The *Nirgal* descended from the sky and landed on pad 3 exactly on time. The conestoga went out to pick up the eighteen Chinese arriving; the other six were coming down the next sol. Will, Enlai, and Brian reserved twenty minutes to change their clothes and wash the smell of food preparation from their hands and faces. They were ready just seconds before the conestoga entered the garage.

“I hope the work was worth it,” said Brian.

Will looked at him. “It doesn’t matter. We have done our part. It’s up to them to do their part.”

Just then Feodor hurried up, dressed in a suit and tie, just like Will and Enlai. Brian was wearing his United States Navy dress uniform. “I hope this looks good; it’s the only suit I have.”

“It’s fine. It’s what your grandmother would expect, right?”

“Absolutely.”

A moment later the conestoga door opened and General Zhou Qisheng led the Chinese team out. He was dressed in a crisp and impressive Chinese Air Force uniform, in spite of the eighteen-hour flight to Dawes from Embarcadero.

“General Zhou, welcome to Mars,” exclaimed Will, extending his hand.

“Thank you, Mr. Commissioner,” he replied with a warm smile. He turned slightly so that a camera on the wall to his right would have a good angle when they shook hands, for the welcome was being broadcast in China.

“I hope you had a good flight?”

“Yes, quite good.”

“You know Dr. Tang, of course.”

“Welcome to Mars and Dawes Outpost,” Tang said in Chinese, shaking the hand of his compatriot. “We are delighted you’ve arrived.”

“Thank you, we are very happy to be here.”

“And this is General Brian Stark of the United States Navy, the director of the New Hanford Nuclear Reservation at Aurorae.”

“I’m very pleased to meet you, General Zhou,” said Brian.

“Thank you, it’s an honor to meet you.” Zhou seemed surprised Stark was there.

“Allow me to introduce you to Chief Minister Feodor Velikovsky, the sol to sol manager of Dawes Borough and Dawes Outpost,” added Will.

Feodor offered his hand. “Pleased to meet you, General Zhou, and welcome to Dawes. We are delighted the Chinese government is placing its nuclear research facility here. We look forward to working with you closely.”

“Thank you, we are very pleased to be here, Chief Minister Velikovsky.” They shook hands.

“Please call me Chief Minister Feodor or just Feodor. As you may know, we have a custom here of addressing people with their title and their first name.”

“I suppose that makes me General Qisheng, then?” Several members of the crew, including Qisheng himself, chuckled.

“Allow me to introduce the rest of my team, Commissioner. . . Will.” And as each man stepped forward—there were no women on the Chinese team, much to Will’s surprise—Qisheng introduced them to the four men standing to welcome them.

Introductions finished, they all walked out of the garage and down a short corridor into the reception room. Qisheng and his team looked at the attractive room and the ample food laid out before them, then Will led them forward to the table, knowing they were hungry after a long and often stomach-disturbing flight. He handed a plate to Qisheng and insisted he lead everyone through the line, then stood behind the table to offer each person items as they passed. Enlai helped lead the party to the table and started to seat everyone. When Will finally arrived at the seat at the head of the table, he saw Enlai, Qisheng, and Brian chatting quite animatedly about the 2060 summer Olympics in Nairobi that were scheduled for next summer.

“Commissioner, I am overwhelmed by your hospitality,” exclaimed Qisheng. “I was just told that you helped to prepare this feast yourself.”

“The cooks did most of it,” replied Will. “But my dear General, food is one of the things we Marsians have in common; and you are now a Marsian as well as a Chinese, for ‘Marsian’ denotes a residence, not a nationality. If we can’t enjoy a meal together, what would we have left?”

“How very true. I enjoy cooking as well; I will have to cook for you some time, Mr. Commissioner!”

“I would welcome that. How was your rather long voyage?”

“Long. It’s unfortunate we had to leave Earth so late, fly into the asteroid belt, then come back toward Martian orbit. But we’re here.”

“We’re very pleased China was able to capitalize on the agreement so quickly and efficiently. We have a 160-meter dome in storage here, and we’ve been hauling nickel-steel pilings here from Aurorae for half a year, so once your site is finalized, work on the dome can begin.”

“We have eight months before the first cargo arrives; a lot of time to set up the dome. I understand my people will be able to inspect everything.”

“Yes, of course, and we can train them to run the pile drivers and other equipment necessary to set up the dome. The Commission has a list of qualified workers and inspectors able to assist with construction or audit the work.”

“Our security people have already started doing background checks. We will want to interview any worker who sets foot on our reservation.”

“Of course. We have an entire procedure in place from when New Hanford was built.”

“It worked out well; we were pleased with the security and confidentiality,” added Brian.

Qisheng looked at Brian. “I assume the procedure to handle security clearances was not itself classified? I would appreciate hearing about your experience.”

“We can sit and talk,” agreed Brian. “As the official United States representative on Mars, as well as head of New Hanford, I have been asked to welcome you to Mars on behalf of my government. Our two countries both have a role to play in the development of this planet. I think you would agree that we want to see this world become a peaceful, nonmilitarized, and dynamic second home for the human race.”

“Yes, absolutely. You have put it very well, General. We have our separate responsibilities and sacred duties to our governments, but we are committed to the development of a peaceful Mars. My team is excited to be here, because in addition to our important work for our country we are bringing nuclear power to Dawes and should enable a significant expansion of the outpost. Mars has a great future and China is honored to play a role.”

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The reception went several hours, then the Chinese retired to their flats to unpack and rest. The welcoming dinner that evening, open to everyone in the outpost, was a hospitable, even merry event.

The next morning Qisheng and his two chief assistants, Enlai, Will, and Feodor prepared to visit three potential sites for the Chinese Nuclear Research Reservation, all

east and northeast of the outpost. At the last minute Qisheng invited Brian along. Brian proved a useful addition, as he was able to describe the fifteen sites around Aurorae he had considered and the criteria used to choose the final site. At lunchtime, Qisheng insisted on preparing the meal for everyone with the help of his assistants, and Brian pitched in as well, for the Chinese were not yet familiar with the cramped setup in a conestoga.

They headed back to Dawes as the sun was westering. “It appears to me the third site is best,” exclaimed Qisheng. “We’ll have to examine the geological data again, of course. The water supply appears to be excellent, the plain around the site is open and easy to watch, the prevailing winds protect Dawes from accidental radiation leaks, and the actual construction site is high, smooth, and on excellent bedrock.”

“The evaporite deposits under site three are a definite plus,” said Feodor. “You’ll be able to dissolve or excavate caverns in it quite easily. You can even sell the salts, if you wish.”

“We have already been studying the geology there,” said Qisheng. “The distance from Dawes is about the same as New Hanford, also.”

“Fifteen kilometers,” agreed Brian. “Neither too close from the point of view of radiation and security, nor too far from the point of view of commuting back and forth or obtaining emergency services.”

“I’m glad we’ve settle on a potential site so easily,” said Will. “And the rest of your team landed this afternoon, so you’re ready to get started!”

“We are. Our government should be very pleased.”

“It’s important to get construction started as soon as possible because the dust storm season starts in less than two months. If it’s bad, we have to ration power and construction will be slowed.”

Just then Will’s attaché beeped. He opened the screen and saw it was a confidential transmission. “Excuse me.” He rose and left the cab. The two Chinese assistants and Enlai were sitting and talking in the main area of the conestoga, so he retired to the bathroom and closed the door. By then, the connection had gone to videomail, so he pushed the icon to see his message.

Kent Bytown’s face appeared on the screen. “Hi Will, this is Kent. I thought I’d call to let you know that Robert Kampala just called us on his voice-activated phone line. He asked for Yuri and me to come see him. He’s ready to talk.”

## Trials

late December 2059

Sebastian hurried across Andalus Square and up the street leading to Cathay. The street was festooned with lights and banners reading “Happy New Year 2060,” for they were approaching that holiday. He passed through the tunnel and crossed into Cathay at the dome’s southern edge. He turned right and passed through a revolving door into Cathay’s eastern rowhouse. The building’s grand entrance led to a corridor running the one hundred-fifty meter length of the rowhouse. Thirty meters down the corridor he ascended a spiral ramp to the fifth floor, taking his time not to strain his heart. At the top he knocked on the door marked 507.

Irma Langlais opened it. “Come in, papa,” she said. He kissed her on the cheek.

“How are you?”

“Pretty good. It was a busy sol in the hospital; we had *two* births.”

“Wow, that’s unusual.”

“Yes, but it’s happening more and more. The hospital’s projecting 333 births this columbiad, or three per week. How was your sol?”

“Pretty good. The *Piazzis* landed on Hebe.”

“I heard.” She closed the door behind him. They were in the parlor, a room five meters square with large windows opening on Cathay’s riverwalk. To the left was a five by two meter kitchenette with a small stove, fridge, and sink; a pot of vegetable stew sat on the counter next to a bowl of salad. A corridor ran from the kitchenette to the left, to a bathroom and two bedrooms.

Kristoff came out of the corridor; he was still tucking in his shirt. “Hey dad.”

“How was your sol?”

“Not bad; the infestation of borers finally seems to be coming under control.”

“Did you have to spray?”

Kristoff nodded. “Unfortunately. In these little spaces, biological control doesn’t always work fast enough.”

“I’m amazed we manage to create such balanced ecologies in the first place.”

“Except when borers that shouldn’t be on Mars at all move from a temperate biome to a tropical biome on someone’s clothes, and they have no natural enemies there!”

“Here, let’s eat,” said Irma. She pulled the food out of the kitchenette and placed it on the dinner table while the two men grabbed the bowls and cutlery. They sat and began with the salad. Irma walked back to the bathroom and brought a pill container to the table. Sebastian spotted it, but said nothing. Irma noticed his glance and held it up. “Geminale.”

“Oh?” Sebastian smiled. “Time for twins?”

“We’ll see,” replied Kristoff. “We’ve been married a year now and we haven’t killed each other, and if we’re going to start a family we might as well take care of the whole thing at once.”

“They say twins are four times as much work as one baby, but daycare helps a lot, Kristoff can take off three months, and the number of years one has dependent children is lessened,” added Irma.

“Fewer years of stress, but more stress,” said Sebastian, nodding. “Grandpa can help also. You make me very happy.”

“We haven’t made you happy yet,” replied Kristoff. “So, did you watch the trial?”

“No, Mission Control was fully occupied with the *Piazzis*’s landing on Hebe. I hear it was really quick.”

“The longest part was seating a jury. Then he pled guilty and read a long statement about what he did, how he got involved in the plot, who he was in touch with, etc. Tomorrow he’ll be cross examined about the detail and there will be some psychiatric testimony about his state of mind.”

“With witnesses on Earth as well as here. That’ll be tedious,” added Irma.

“I wouldn’t want to be a member of the jury,” exclaimed Kristoff. “I guess we have to have one because of United States law about capital punishment.”

Sebastian nodded. “Yes, the Supreme Court once ruled that only juries could impose a death sentence. But there’s an advantage of a jury deciding his fate: no one can blame the Mars Authority or its court system.”

“It seems straightforward to me,” said Kristoff. “He has cooperated and told everything he knew. If the testimony is credible, he should be flown back to Earth and spend the rest of his life in prison there.”

“Whatever they decide will be controversial, believe me,” replied Sebastian.

“At least it’ll be over soon,” added Irma.

Sebastian had finished his salad and ladled some stew into his bowl. He took a sip. “Pretty good.”

“Yes, Deseret sells some great dinners, and all I have to do tomorrow is return the dirty crock pot and the dirty salad bowl to them,” said Irma. “So simple.”

The videophone rang. “That’ll be Helmut,” said Sebastian. He always called during their Tuesol dinner. Kristoff jumped up to activate the video message and they turned to the videophone.

The faces of Helmut, Clara, and Charles appeared on the screen. “Hello everyone,” began Helmut. “It’s just after lunch for us and I’m about to go outside as a member of the EVA party to set up the greenhouses, but I’ve got a few minutes to say hi. We had a nominal landing four hours ago and three hours ago the first members of the geology team went out and started local exploration. Then team two went out to deploy the hoppers and set up the drill. So far, Hebe’s as exciting as we expected; it’s the source of forty percent of the meteorites that strike Earth and is a fascinating mixture of iron and chondrite. The excitement of a new landfall is already wearing off, though. We’re all looking forward to aerobraking into Mars orbit in eleven and a half months! It’ll be good to be home.

“I hope all is well with you. We’re doing fine, as you can see. Charlie, what can you do now?”

“I can read all of *Good Night Moon!*” he replied.

“The whole book,” added Clara. “And he’s reading the words, not just looking at the pictures.”

“Since he’s basically being home schooled up here by eight people, he’s learning fast,” continued Helmut. “We suspect he’ll be ready for Martech next year. . . well, maybe in nine years, rather than eleven. We’ll see.”

“I can’t think of much else to mention,” said Clara. “Landing on Hebe means we’re busier and we have a place to walk around; a nice antidote to cabin fever. I would recommend against four-year missions to four asteroids in the future. Make the trips shorter, the last destinations are anticlimactic. Otherwise, we’re busy digesting the Mars news, since we still consider ourselves Marsians. The short trial will be a big discussion tonight, but the buzz at breakfast was about the rumor that the Mormons, Nigerians, and Japanese coordinated their votes to get Bruce Cowdrey elected to the Councils. What do you know about that, anything? That’s it for me.”

“Me too,” added Helmut. “I got to go suit up. Talk to you in a few sols. Bye.”

“Bye grandpa and uncle Kristoff and auntie Irma!” added Charles. Then the screen went blank.

“It’s good to see they’re doing well,” said Kristoff, getting up to set the videophone on record. “Transmission time’s twenty-three minutes, by the way.” He sat and the record light on the videophone turned green.

“Hello to you all, good sol,” replied Sebastian. “We’re fine here, enjoying a crock pot of Deseret vegetable stew and a salad. I called the tenants in your flat earlier today and reminded them you’ll be back in December of next year and they said yes, they were planning to buy a unit by then and had already started looking at the new flats being built in Punjab. His salary goes up in a few months and at that point they’ll have the income to go for a sixty-meter flat, which is the minimum space they want for the next few years. So that’s coming along. You may want to videomail them after New Years, wish them a happy new year, and remind them. I suspect you’ll want to move not long after getting

home because the new flats are really much nicer, and you'll have plenty of accumulated salary to move into a bigger place.

“Not much else is new around here. We'll skip our Tuesol dinner next week because we're having Christmas dinner together this Frisol and New Years dinner next Frisol. I'm sure we'll hear from you on both of those occasions. We'll have to talk separately about Charlie's presents; I'm glad he's asked for a lot of computer games! That's all I can think of; Irma?”

“It's the same same for me. We're having an epidemic of babies right now; the number is literally doubling every columbiad. Last week *Mars This Sol* had an article about the need for a bigger elementary school, probably in the Borough building on Andalus Square. Kristoff and I will contribute to the population explosion pretty soon. Oh, papa, they asked about the election rumor.”

“Oh, that's right. The rumor is floating around here as well, and was posted yestersol in an article in *Mars This Sol*. Who knows what to make of it. Cowdrey was elected with 77 votes, which is roughly equal to the Mormon, Nigerian, and Japanese voters. But he's pretty well known around here, so it's plausible that a number of people voted for him spontaneously. Some voters seem to have a sense of proportionality, in other words, that it was time that someone from the new immigrant groups be elected to the Council. So I wouldn't worry about it. The Aurorae Borough Council had two new seats and Aurorae had two new seats on the Mars Council, so new people had to be elected.”

Sebatian turned to Kristoff; it was his turn. “I talked to Lisa Kok today and she approved my plan not to return to Phobos. I'm staying here for a while. She offered me

the chance to plan Andalus Northeast; the pile drivers have started to place the foundation and the dome is scheduled to be inflated in about ten months. It'll be a tropical biome with a summer rainy season; Andalus Northwest, next door, will have a Mediterranean-type climate with a summer dry season at the same time. Together they'll add three hectares, enough to feed 300 people. That sounds like a lot, but the next columbiad will see the arrival of 750, and the birth of many more. We're growing fast now.

“Anyway, you guys enjoy your work, and come on home! It'll be good to have all of you back here with the rest of the family. Bye.”

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Will kept one eye on the small television image in the lower right corner of the screen of his attaché and the other on the chronometer setting. Érico Lopes and Bruce Cowdrey were two minutes late. He had things to do, so their tardiness irritated him; on the other hand, it gave him more time to watch the news. The Khaliestan election had been held a week ago, just before New Years 2060, and the results had not been announced. There was significant evidence of systematic vote tampering by the American-dominated interim administration, and hour by hour it seemed more likely that Muhammad Sayfullah, a radical Muslim leader, had been elected President. Since Sayfullah had pledged to expel the Americans immediately and had even approached the Chinese for technical and military support, and they had subsidized his campaign, the election could create an enormous political crisis.

But at the moment the BBC was nearing the end of the news cycle and was dealing with sport and cinema. Nothing new could be expected. So Will tapped an icon

on the attaché screen. “Genie, can you call the attachés of Érico and Bruce and ask when we can expect them?”

“Right away,” his attaché replied. In ten seconds she had a reply; “They’re both running late because of unexpected demands on their time. Érico should be here in four or five minutes, Bruce a minute or two later.”

“Thank you. Pull up my messages then, please.”

A moment later a list of messages appeared on his screen. The first was from Rick Page, head of the Lunar Commission. They had been exchanging a lot of short emails lately about a variety of items. Will suspected it was about purchase of Phobosian carbon. Every tonne of PGMs required the conversion of about 30,000 tonnes of meteorites into metal carbonyl gas. Very slight losses of carbon monoxide in the recycling process meant that every tonne of PGMs required about two tonnes of carbon. About a tonne of that was recovered from frozen volatiles at the lunar south pole. The moon imported food for tourists and personnel and captured the carbon in the human waste, but carbon still had to be imported from Phobos. Thus Mars profited from the moon’s production of PGMs.

But Rick wasn’t calling about the need for more carbon. “Watch out, Will,” he began. “About half an hour ago I got a call from a United States general who was asking me—the feeling was ordering me—to make contingency plans to shut down Chinese lunar operations in the event of hostilities between the U.S. and China. How have you handled trouble like this? I passed the message on to my assistant, who is European, for a routine acknowledgement. We’ll ignore it. Besides being illegal, any effort to follow the orders of the U.S. would stir immense resistance on the moon. We’re a multinational operation, not a national moon base, after all.

“I hope you are well and you enjoyed New Years. Bye.”

Will took a moment to consider Rick’s message. It suggested a far greater deterioration of relations than he had suspected. He copied his response to Pierre Messier in Paris; the Assistant Commissioner would talk to his contacts and verify the situation. “Good day, Rick. I’m very saddened and worried about your message. I suspect no one will dare call me and make such a suggestion. Six years ago when Houston got nuked I refused to bend to the U.S. even though they audited my tax records and tried to come up with charges on which to arrest me. But I am grateful for the warning.

“I’m not sure what to suggest because you are a lot closer to Earth than I. Theoretically, they could rig up something to launch a smart bomb at the Chinese facilities, or even at the international facilities. We don’t have that worry here. We’re protected by distance. I’d recommend that you stall as long as you can, then be clear and uncompromising; otherwise they’ll hound you. If the Mars Commission can help, let me know. We won’t tolerate favoritism of one nation over another up here; it could destroy our community. Bye.”

He sent the message and pondered the dangers to Mars. The Commission’s Board of Trustees—the national representatives—might vote to favor one or the other country. That would create a terrible conflict, not only for Will, but for the vast majority of Marsians. In fact, it was the sort of situation that might trigger a declaration of independence, in spite of the terrible economic consequences for Mars.

His thoughts were interrupted by a knock on the door. Érico had arrived. “Come in; good sol.”

“Good sol; here at least. Did you see the weather forecast?”

“Yes, the Hellas dust storm should reach Dawes in a few sols. That’ll make a mess of the construction project.”

“How far along are they?”

“The pile drivers have placed 75% of the perimeter pilings. The rest will take three weeks at full power. If the dust storm cuts power production, they’ll have a fight on their hands to decide what to cut and how much to dip into the reserves.”

“They have three months of full power production in storage, just like we do.”

“Yes, if the spaceport is shut down and all the methane and oxygen in storage is run through the fuel cells. But Dawes also has a lot of plant matter and oxygen—they were exporting food for four years and stored a lot of the plant waste. They also have a good heat reservoir underground and good wind power production. So we’ll see. I’ll probably get complaints from everyone in about a week about how unfair Velikovsky’s rationing plan is.”

“Probably.”

“Say, the situation on the Earth is beginning to impact the moon. Page got a call this morning. . .” Will’s voice trailed off because Bruce Cowdrey had arrived. “Oh, Bruce, come in. Érico, I’ll tell you that story later. How are you this sol?”

“Pretty good. We had a really nice New Year’s celebration,” replied Bruce. “Of course, for us Christmas is the big gathering. Henry tells me that Deseret sold more presents for New Year’s than for Christmas, though.”

“We’re basically a secular society,” concluded Érico, with a certain pleasure in his voice.

“Let’s get started,” exclaimed Will. “Bruce was talking to me a few sols ago about a new approach to construction that will make housing more affordable. I suggested he present his idea to the two of us once it was refined a bit better.”

Érico’s left eyebrow went up. He and Bruce both sat. “I proposed a factory to make modular homes,” began Bruce. “The mass production of nickel-steel for PGM extraction and the cold-rolling plant set up three years ago allow a new approach to construction. I can order nickel-steel sheets ten by eighteen meters and three millimeters thick and run them through a folding machine that will convert them into boxes ten meters long, four wide, and five high. The width is the maximum practical for movement on our dirt roads; the height is minimal for installing a floor in the middle and making two stories. Robotic welding units can weld the seam, the second story floor, walls to make rooms, two spiral ramps to connect together the floors, and the two endcaps, both of which will have hatches. Each unit will have eighty square meters; big enough to house at least two adults and a small child. The factory could install everything in the kitchenette and bathroom, all the wiring, the vents, the lights, and finish the interiors.”

“And you’d bury them for housing?” asked Érico.

“Yes. You could also weld on a chassis and convert them into mobile bases; they have about four times the interior volume of a Mobilhab. They’d make excellent oases; we could place one every five hundred kilometers along the Circumnavigational and Polar Trails. One factory at Aurorae could supply them anywhere on the planet.”

“How much?”

Bruce hesitated. “It’s hard to be sure, but I think we could make an 80 square meter interior unit for a half million redbacks, or 6,250 redbacks per square meter.”

“That’s two thirds the cost of Simeon’s units and less than half the cost of Alexandra’s.”

“Both of those construction techniques use airtight plastic enclosures with small airlocks,” replied Bruce. “As a result, everything has to be moved inside a bit at a time assembled. But we won’t weld on the endcap until the inside is complete.”

“We have to look into that,” said Will. “What about insulation?”

“We’ll install it in panels on the outside because it’s usually flammable material. Floors will be tiled or carpeted.”

“What about natural light?” asked Érico.

“We can install skylights, but they can’t be more than a meter square. If people want gardens and ‘outside’ space we can install grow lights or they can go to a dome.”

“That means the borough will probably add a surcharge to your system of about twenty percent, to pay for the creation of more public space in the domes.”

Bruce nodded. “I know, but these modular homes will still be cheaper. Right now people with starting salaries of 300,000 redbucks per year are purchasing 25 square meter efficiencies in the domes for 600,000 redbucks. That’s basically a bedroom of average size, a bathroom, and a closet. These modulators would give them almost twice as much space for half the mortgage! That’s very affordable.”

“It will help a lot,” said Will.

“That’s true,” agreed Érico. “I still wish we could raise starting salaries ten percent, though. There has been a serious erosion of purchasing power in the last decade; people start with a serious financial struggle.”

“Érico, the situation when you and I arrived here was very comfortable financially, but we were risking our lives,” replied Will. “The future of Mars lies in lowering our costs, not raising them.”

“And if you raised starting salaries ten percent, I’d have to raise the cost of housing, because I’d have to pay my workers more,” added Bruce. “Construction is very labor intensive, even with robots.”

“If arrivals purchase flats that cost half as much, that gives them the equivalent of a ten percent raise anyway,” said Érico. “What will Alexandra think?”

“She’ll be immensely upset,” replied Will. “But she’ll adjust. Construction techniques here don’t stand still. Our first housing was inflatable units flown here from Earth. Our second system was heavy buildings of duricrete with meter thick walls and tiny windows. They were ugly and leaked a lot of air. Alexandra rebelled against them and developed the biome and the system of constructing inside bubbles using nickel-steel and sheet rock. Then the Green World Community developed the polder system with domes that were open to the land beneath them; she resisted that change, but had to accept it because it was cheaper, once the bugs were worked out. Now the construction-in-a-bubble system has to change as well. And housing will become cheaper.”

“Which is good; we’ll get housing that is more affordable for new people and is bigger for people who have been here longer,” said Érico. “When will you start manufacturing?”

“It’ll take a year to set up the factory,” replied Bruce. “I’ll need to get all sorts of permits, too, and that will take time.”

“You’ll have to present the plans before the Borough Council,” agreed Érico.

“Exactly. And now that I’m on the Council, I may actually get a rougher time than otherwise. Which reminds me, let me assure both of you that the rumor is not true; there was no whisper campaign to vote for me. We were tempted to do it, but decided to respect the informal system.” He rose. “I better get back to my office. There are a lot of details to hammer down, still.”

“Thanks for coming, Bruce,” said Will. “Let me know how your plans develop.”

“Glad to. I’m expecting a report today of other uses for the metal boxes, like storage of cryogenic liquids. Have a good sol.”

They echoed his greeting and watched Bruce Cowdrey step out of Will’s office. “It has a lot of potential,” Will said to Érico, after Bruce had left.

“Yes, though I’d still prefer to see salaries go up. I suppose falling prices are the next best thing, though.”

Will raised his hand. “Oh, something’s happening.” He turned up the sound on his attaché so they could listen to a news report about Khaliestan. The election returns had finally been released; Muhammad Sayfullah had won 53% to 47% and had immediately announced that American soldiers had to leave the country in thirty days or they would be driven out.

“Oh, God,” said Érico. “I doubt the U.S. will trust Sayfullah with the country.”

“I agree,” said Will. “They invaded the country to eliminate Islamic extremism, but the way they occupied it raised public support for extremism from twenty percent to fifty-three percent.”

“They should have waited and not held the election so fast.”

“They didn’t want another Iraq, I think. At least Sayfullah isn’t implicated in the release of the flu virus.”

“Not that that will reduce the hostility of the U.S.”

“No. And just before Cowdrey arrived I was going to tell you about my call from Rick Page, who received a call from an American general asking him to prepare to close the Chinese station on the moon if hostilities broke out with the U.S.”

“Really? That would be illegal!”

“It would, unless ordered by the Lunar Commission. The United States seems to be going crazy again and destabilizing the world through stupidity; and this time the liberals are in charge, who supposedly know better. The Mars Commission or the Mars Authority could face a similar situation.”

“That’d be terrible.”

“I agree; let’s hope it doesn’t happen.”

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The next morning, everyone on Mars interrupted their schedules to listen to the verdict in Robert Kampala’s trial. As soon as Will Elliott heard that the jury would be seated in forty-five minutes to announce their verdict, he headed for the Mars Authority Building on Andalus Square.

He managed to get into the observer’s section just as it filled. He looked around the new court room—a very impressive grand space, the only court room on Mars—and chatted with Eammon O’Hare, another old timer. Precisely at 11 a.m., Kent Bytown entered and exclaimed “All Rise for Judge DiPonte” and they all stood. Silvio entered in

his robes, bade everyone to be seated, and called in the twelve-person jury, who filed in and sat in the jury's box.

"The defendant will rise," ordered Silvio. "Does the jury have a sentence?"

Robert Kampala stood nervously. Sun-Hee Jung, the foreman of the jury, rose. "We do, your honor. We, the jury, recommend a sentence of life in prison for Mr. Robert Kampala."

"Thank you, ladies and gentlemen of the jury. You are dismissed from the case with the gratitude of the public." Silvio turned to Robert. "Mr. Kampala, a jury of your peers has sentenced you to life in prison. They have therefore accepted the recommendation of the prosecutor that your life be spared in return for your testimony about the terrorist plot that killed tens of millions of human beings and continues to kill the poor, the old, and the helpless. Until you can be transported back to the state of Texas, you will be confined in the Mars Authority jail. If you make any attempt to sabotage the ship transporting you back to Earth, those on board, based on Marsian law, are authorized to execute you.

"Your crime was particularly heinous. If you had succeeded, as we heard during the sentencing phase, it is possible that as many as one third of us would have died. Therefore you can be thankful your life has been spared. Have you anything to say?"

Robert hesitated. He looked around; all eyes were on him. "Your honor, in the last month I have come to feel deep regret that I allowed myself to be duped into participating in this gruesome plot. I could have made a valuable contribution to the settlement of this place through my skills repairing things. I wish there were some way we could forget everything that has happened and start all over."

“Well, Mr. Kampala, it sounds like you have a lot of things to ponder in the future.” Silvio raised his gavel. “Justice has been done. This court is adjourned.” And he banged the gavel once.

Everyone rose and began to talk. Will followed the crowd out the door and chatted with others. He contemplated the terrible tragedy that could result when too many brain cells were devoted to a single skill—in this case, the ability to repair—with a corresponding deficit devoted to social skills and moral reasoning. He stopped to answer questions from Mars’s four reporters—two were part-time stringers for terrestrial networks—then headed out onto the plaza. Brian Stark was standing there watching him. When Will noticed him, Brian began to walk over. “Good sol,” he said. “Can we talk?”

“Sure; private?”

Brian nodded and Will pointed up the street leading to his house, which was closer than his office. “I assume this isn’t about Kampala.”

“No. The verdict was virtually a foregone conclusion. I hope he rots in prison in some God forsaken corner of Texas.”

“Brian, according to the Texans, the state has no God forsaken spots.”

Brian smiled. They walked up the street leading to the tunnel that led to the Elliott house. Once into the tunnel, Brian said, “You saw the morning news?”

“Of course. The U.S. wants to cancel the election and pretty much the entire world is mad.”

“Not as much of the world as you think. The Europeans are terrified of a fundamentalist Muslim state controlling a fifth of the world’s petroleum, so their talk about human rights and respecting laws is just that. The Russians, of course, are

concerned the U.S. will have a proxy state in the Middle East; they're a major oil exporter. But they aren't so powerful. And the Chinese; well, they're the problem."

"Of course. When Khaliestan said it wouldn't export oil to Christian countries about two years ago, the Chinese were the major beneficiary, and then they were screwed when the U.S. took over and canceled the contracts. They'd kind of like to get the petroleum back to regenerate five percent of their economy."

"Well, we'd like the petroleum, too, and there's no longer enough to go around. And don't tell me the U.S. should have been switching to fuel cells and solar for the last fifty years, or that the petroleum corporations are driving U.S. foreign policy. The question, Will, is: are you behind your country or not?"

Will stopped walking and turned to him. "Brian, I have taken a pledge to the Mars Commission and that's my highest loyalty, so don't try to undermine my integrity. Both the U.S. and China knew worldwide oil production had started to decline and either one of them could have turned to alternative sources. Mars is not United States territory. The Commission has treaties with both countries and will honor them. If either country breaks the treaty by diverting uranium or plutonium to military uses, we will shut down that operation."

Brian stared at Will, shocked. Will shrugged. "Anything else?"

“Will, I’ll fight this in the Mars Council,” exclaimed Alexandra, pointing at Cowdrey’s plans for a modular building factory. “First, he wants a special location in the industrial park to reduce transportation costs. Second, he makes no accommodation for open space; he simply stuffs people into buried tin cans and expects them to flood our existing open spaces. Third, this technology could produce suburbs and homesteads because someone could buy two units—for redundancy—and go live in retirement out on the range. Fourth, his plans cut out use of sheetrock and other valuable innovations, producing cheaper quality housing as a result.”

“Alexandra, I think you should look at these plans dispassionately and consider how to accommodate them,” replied Will. “The factory location request is reasonable. The industrial park is expanding and it’s a unused spot. As for open space, Cowdrey could provide it if he purchased ten by twenty meter plastic Quonsets, used them as park space with a public right of way, and installed his housing units along the two sides so they opened into the Quonsets. That wouldn’t cost him too much. As for suburbs and homesteads, the Mars Council and the borough councils will have to zone for them, because they violate existing safety and emergency procedures. As for sheetrock, the interior walls may need them. Maybe the market should make the choice.”

“But you’re forcing me to make a lot of changes in our construction techniques!”

“Alexandra, do you remember how many changes you forced when you arrived? Humans on Earth no longer live in caves. Housing techniques have to change as

conditions change. Our reality now is that we have to house nearly a thousand new people every two years and that we have almost a million tonnes of waste nickel-iron from PGM extraction. It's a vast, cheap, construction resource. *Use it.* The Green World Community and the Japanese have contacted Cowdrey. He plans to use metal construction on the Mormon temple. Even the Bahá'í temple contract might go to him."

"Well, I can see you have your mind made up!"

"My mind is not made up. Convince me this isn't false economy; that the extra costs of the current system are worth it; that we shouldn't save money for our struggling new arrivals; or that people don't need more space for the money. Convince me."

"Well, I'll get back to you with the case, then," Alexandra replied.

"Good. How much time do you need? Three or four sols?"

"Sure, four; next Monsol." Alexandra picked up her attaché and waved goodbye to Will. He waved back to her and she left his office, wondering whether what she'd bring on Monsol. She was stubborn, but she usually came around.

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Érico hated the little details of administration. He enjoyed the challenges of making big decisions about new projects and efforts; designing a government department or program could give one a sense of accomplishing something important. But maintaining its functions was a constant frustration. Each borough ran its own school, but the Mars Authority set standards and oversaw implementation. The Authority was responsible for health care in six boroughs—Aram ran its own clinic—but even the Aram clinic had to maintain certain standards that the Authority had to monitor. The Authority ran two campuses of Mariner Institute of Technology and the Exploration Corps, which did the

basic science about Mars. It contracted control of Mars space to the Mars Commission and its Mars Control facility, but set standards and reviewed them periodically. The Authority's Safety Office checked everything from environmental control to construction and communications standards and approval of medications. Its Licensing Office set licensing standards for physicians and dozens of other professions. Its Office of the Arts provided a million redbacks per year to artists to develop ballet, murals, and other Marsian expressions of art and culture. Its Spaceport and Airport Authority ran three spaceports and six airports, employing thirty people at Aurorae to inspect and maintain shuttles and run the physical plant, especially cryogenic fuel and oxidizer storage.

Finally, the Roads Department employed two road-building teams of fifteen people each; one had left Aurorae a month earlier to widen the Polar Trail all the way to the North Pole, while the other had widened and improved the Circumnavigational Trail halfway around Mars. Both teams installed an "oasis" every thousand kilometers consisting of an emergency shelter, a dirt runway, a water well, solar panels and wind turbines able to make five hundred kilowatt-hours per sol, fuel cells, a sabatier reactor, and tanks able to store forty tonnes of oxygen, ten tonnes of methane, and fifty tonnes of water.

Altogether, the Mars Authority employed 250 people, about a fifth of all adults on the Red Planet. Another hundred workers on Earth maintained payroll and benefits records and other routine support work that could be outsourced to cheaper labor markets. To pay its workers and maintain or expand its facilities, the Authority levied 150 million redbacks of taxes a year, mostly on exports, and received 100 million redbacks of

subsidies from the Mars Commission. It was a large, sophisticated operation. Érico was constantly busy reading reports, verifying information, and putting out fires.

He glanced at his watch; it was almost noon. That was good because on Frisols he spent the afternoon doing geophysical research. Lately he had been analyzing a seismic survey of Noachis, one of Mars's oldest and most geologically complex terrains; the subsurface consisted of thick layers of crater ejecta punctuated by wind-blown and water-transported strata and basalt flows, with occasional lumps of meteoritic fragments. It was fascinating work and he still managed to publish at least one paper a year.

He returned to his work composing a message to the Circumnavigational Road Team, thanking them for their accomplishments and praising the importance of their work. He spent a lot of time encouraging when he wasn't dealing with errors, misunderstandings, misdirected efforts, and egos. Writing had been difficult that sol; he had been distracted. It wasn't until 12:30 when he finally completed his first draft.

He rose to go to lunch and just as he reached the door, the videophone rang. Reluctantly, he returned to his desk. "Activate," he said.

It was Dr. Eve Gilmartin at Mariner Hospital. "Érico, this is Eve. Could you come down? Corazon is here."

"What happened? Is she alright?"

"Nothing serious. She was feeling sick at school, so they called us and we wheeled her over. We did some quick checks. She's. . . pregnant, Érico."

He felt the shock of the word travel from his head down his back to his feet. "What? Pregnant? Okay, I'll be right there. Did you call Carmen?"

"She's on her way. See you in a few minutes."

Érico nodded, deactivated the videophone, and dashed from his office. His seventeen year old daughter, pregnant! He wasn't sure whether to be incredulous, shocked, or angry. Probably all three.

He ran the three hundred meters to the hospital, his head full of questions. Who was the father? The most likely boy was Sam Anderson; he and Corrie had been friends for years. If it wasn't Sam, it'd be an adult, and since Corrie was underage it would be statutory rape. Actually, Sam was just weeks short of his nineteenth birthday, so if he was the father it was statutory rape as well.

He dashed inside the hospital and headed for Eve's office. She had been their doctor since before Corrie's birth. His anger was rising minute by minute; he barely noticed that he was panting from the run. When he reached Eve's office, though, the sound of crying changed his feelings radically. He opened the door and saw Corrie inside, standing cuddled against Carmen, crying, with Eve inconspicuously looking on.

Érico came in and hugged his daughter and he began to cry as well. He hadn't cried in years; he hadn't expected to cry; and as he cried he wasn't completely sure why he was crying. But it didn't matter.

"I'm sorry, dad," she finally said.

"It's okay," he replied. He hugged her even more tightly, and Carmen as well.

"I don't know what to do, dad."

"Don't worry, we'll figure that out. Who's the father, honey?"

"Sammie."

"That's what I thought."

“Well, don’t get too angry with him. We. . . we. . . we’ve spent a lot of time together lately.”

“We should have never let you work in the store,” exclaimed Carmen. Corazon had asked to work at Silvio’s because Sam was already there.

“How did this happen?”

Corrie looked at her father with a mix of shame and fear. “Well. . . we went for a walk in the ‘Hilo’ Bioarchive Dome, and . . . we went too far. The next morning we both felt really bad about it, and scared.”

“When was that?” asked Carmen.

“Late October.”

She nodded.

“What do we do now?”

“Well, let’s get our heads clear first,” replied Érico. “There aren’t many options. You have an abortion. You keep the baby. You put the baby up for adoption.”

“God, I don’t know whether I could handle seeing a baby around the outpost and know it’s mine!”

“There are no easy choices, dear,” said Carmen.

“Should I step out?” asked Eve. “We called Sam and asked him to come down right away. He should be in Cornelius’s office by now. I suspect Cornelius took the liberty of calling Roger and Madhu as well, even though Sam is an adult. We haven’t called Kent Bytown because we don’t know whether you want to press charges.”

“Press charges?” exclaimed Corrie, horrified.

“He’s an adult and you’re a minor; this is statutory rape, by law,” replied Carmen.

“No, please don’t press charges against him!”

“Don’t worry, honey,” replied Érico. “We haven’t done that yet and I’m not inclined to. Not so far, anyway.” He looked at Carmen and she looked back at him.

Corrie began to cry again. “What will I say to my friends?” she finally said. “What will they think? What will the younger kids think?”

“Honey, don’t worry about that now,” said Érico. He hugged her and wondered what people would think of Mars’s Chief Minister having an unmarried, 17 year old pregnant daughter. Carmen hugged Corrie and wondered where they had gone wrong and whether this proved anything about their parenting. Mars had quite a singles scene and the kids knew it; as family friendly as Mars was, it had plenty of bawdiness. Then there was television, the monster with 500 channels.

They stood without speaking for several minutes, though it didn’t feel like several minutes. Then there was a knock on the door. Eve opened it; Cornelius was there. “Sam and his parents are here,” he said.

Eve nodded and looked at the others. “Oh, invite them in,” said Érico. He looked around the room, then sat on the couch. Carmen and Corrie followed.

The Gupta-Andersons walked in. Roger was very agitated; Madhu, stunned; Sam, abashed. Érico looked at the familiar young man, tall and black-haired, whom he had known since his birth. He had changed the boy’s diaper once. Now the young man was the father of his grandchild. Roger and Madhu were old friends, friendly rivals, and debating partners with whom they had spent countless hours and a few vacations.

Sam saw Érico glance at him and looked away. Cornelius and Eve hurried out to the waiting room to drag in more chairs.

“Eve and I are trained as counselors, but we don’t even know whether you want our advice and involvement,” said Cornelius. “So should we leave, stay, or assist?”

“I say assist,” replied Érico, and he looked at the others. Everyone said “assist” or nodded, except Roger, who said nothing. They knew Eve and Cornelius well; they had eaten with them and their families; they had used their medical services for two decades.

“Good. This is the kind of situation we’re trained to facilitate,” said Eve, glancing at Cornelius. The glance seemed to hint at uncertainty. “Not that we’ve ever had this particular problem before. Before we go around, I suggest we start with a simple breathing exercise to let go of our passions. This is the kind of event that stirs up lots of feelings. Let’s have thirty seconds of silence. Those who wish to pray silently are free to do so.”

Silence enveloped the room. Eve and Cornelius relaxed and breathed slowly, eyes closed, to be examples. Érico had no sense that he could slow his breathing; he was too worked up. Corrie seemed too distraught to relax. Sammie and Madhu appeared to be praying; this was a time that tested and brought out their evangelical Protestant faith. Roger just stared.

“Okay,” said Eve. “That was thirty seconds. I don’t think we should aim to resolve this matter today. There is a young woman here with a fetus growing in her body. She has the ultimate veto in this matter. There is a pair of young people who shared something together that make them potential parents, with all the responsibilities that requires. They have to talk together without the interference of others. Then there are four parents of the two young people, who are potential grandparents, who have busy lives that may have to be rearranged, whose priorities may have to be sacrificed, whose image

of themselves as parents and the image of their families have been profoundly altered. There is a fetus in this room, whom some here consider a living human being with a soul. And there are two counselors here who represent the community, which is also involved. We have many circles to remember here. Many circles of relationships to weigh and respect.”

“Well, that’s one way to put it,” exclaimed Roger. “Potential parents? Potential grandparents? A ‘fetus’? We have a baby coming and no marriage, no marriage really is practical or reasonable. . . I’m very disappointed. . . I can’t believe my Christian son would do this. . .and we grandparents are really too old to take over, I’m 63, Madhu’s 62, Érico’s 51, Carmen’s 50. . . and we certainly can’t abort the baby.”

“Roger, that’s not your decision,” exclaimed Érico. “That’s Corrie’s.”

“It isn’t a decision, it’s a baby!”

“It isn’t a baby yet,” replied Carmen.

“You’re talking about your grandchild!” added Madhu.

“So much for breathing,” muttered Eve. Corrie broke down and began to cry. Sam walked over to comfort her, but Érico was seated next to his daughter and he didn’t move over to give the boy room, leaving Sam to stand there helplessly.

“We made a mistake,” pleaded Sam. “I want to do the right thing and take responsibility. I’ll even marry Corrie.”

“You can’t marry her, she’s seventeen,” replied Érico. He stared at Sam for a moment, but then budged and made room for Sam to sit next to Corrie.

“There’s always adoption,” said Madhu. “There are a lot of couples here who want children.”

“We don’t have a formal waiting list,” commented Cornelius. “So far, we’ve only had one case where there was an unwanted pregnancy, but the couple kept the child, so we’ve never had an adoption on Mars before. However, finding a good couple to adopt the child, if that is the decision of Corrie and Sam and the rest of you, should be easy. The couple could even be located at a different outpost. You can choose the couple yourselves from any that pass the screening process; you could even interview couples if you want. That’s called an open adoption and it is the commonest type.”

“Of course, on Mars a closed adoption is really impossible,” said Madhu. “This place is too small for the adoptive parents not to know the birth parents and vice versa.”

“Let’s not push options,” said Érico.

“Érico, it costs ten million redbacks to import each human being to Mars, it makes no sense to abort them,” said Roger.

“It’s not your decision, Roger,” replied Érico. “I’m not saying I favor abortion. I favor my daughter’s right to choose, to decide.”

“Sheez,” replied Roger in disgust. Corrie began to cry more loudly.

“Okay, everyone,” said Eve. “There’s too much being said and too much going on. This isn’t working for Corrie. She needs time to recover, talk to her parents if she wants, talk to Sam if she wants, talk to Roger and Madhu if she wants, talk to me or Cornelius if she wants. . . in that order, I think. Let’s reconvene again tomorrow, tentatively at this time. Corrie, do you want to go home? Will that be better?”

Corrie looked up, teary and red-eyed, and nodded.

“Alright, dear, call me or stop by if I can be of help,” said Eve.

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Will could feel the tenseness in the meeting room as soon as he stepped through the door. There were only four Chinese sitting at the table waiting for him, but there was an air of expectation and nervousness that was palpable.

“Good sol, it’s good to see all of you,” he said. “Thanks for organizing a meeting with me.”

“Thanks for coming, Will,” said Enlai. “How are you?”

“The usual: harried. My work never ends, and the situation on Earth makes it so much worse because of the uncertainty. I suppose that’s a reason for this meeting.”

“Tea?” asked Tan Jen, a glaciologist. He pointed to a small pot.

“Yes, thank you.” Jen took a cup and poured him some green tea. Will took it, sipping some. “Oh, that’s nice tea. I suspect you all are feeling pressure from our peers.”

“Yes, exactly,” said Enlai. “People look at us suspiciously, some seem to avoid talking to us, etc. No one has openly insulted a Chinese resident or discriminated against us, but there are rumors.”

“Prince Bilal ibn-Majid Abbas is stirring up trouble against us,” added Xiapeng Cai, an eobiologist. “As a member of Khaliestan’s displaced royal family, he has always been opposed to the revolution there and Sayfullah’s candidacy. Now that Sayfullah has invited the Chinese military to step in as peace keepers in place of the Americans, he’s actively whispering rumors about the entire Chinese community on Mars. We’ve heard that he has said we are all spies for our government and can’t be trusted, that we might try to take over Mars, that we have our own agenda up here. . . it’s vicious stuff.”

“It’s outrageous,” exclaimed Will. “I can go talk to him. He should know better; starting rumors like that can backfire and make yourself the butt of similar rumors.”

“The entire atmosphere in the Gallerie feels strained,” added Enlai.

Will nodded. “I’ve felt it, too. The situation on Earth keeps deteriorating. Now the Russians also are saying the Americans should withdraw from Khaliestan and let the Chinese in. Europe is split down the middle about the matter. Everyone was sympathetic to the American invasion when it was proved the Khaliestanis were behind the flu pandemic, but the sympathy has waned now that the Americans refuse to accept the election. The Indians are furious the Chinese might gain influence over Middle East oil fields. Meanwhile, up here, everyone is talking about the strains on Earth and often they’re siding with their home country.”

“I’ve never felt such polarization,” said Enlai.

“I agree,” said Will. “I’m going to have to do something about it.”

“Do you think there’s going to be a war?” asked Xiapeng.

“I don’t know. The Chinese and Americans are disentangling the trade between their countries, and considering that’s several trillion bucks a year, it’s a massive economic dislocation by both sides. It’ll be hard to step back from a brink like that.”

“Not to mention the threat by China’s federal reserve to dump its dollars and buy euros,” added Xiapeng.

“There’s always cold peace,” replied Enlai. “The entire world seems to be moving toward a cold peace.”

“Very cold,” quipped Will. “I suppose the next step will be a proxy war.”

The others nodded. “What about the rumor that the Commission is slowing the construction of our facilities at Dawes because of the crisis?” asked Xiapeng.

“Not true. I have already stated that in writing to your government. Right now, Dawes is getting only half its normal solar power because of the dust storm. I’ve authorized the shipping of thirty tonnes of methane and a hundred tonnes of oxygen there from Cassini to help make up for the shortfall. We’re beaming surplus power to Cassini from here because the air is still relatively clear there. If the dust storm spreads, though, we’ll have to cut back on everything.”

“And what about the rumor that New Hanford sent a spy to Dawes to check on our facility?” persisted Xiapeng.

“I’ve heard that rumor; I’ve also been informed of a rumor that the Chinese have spies watching New Hanford. Twenty percent of the Martian population is American and ten percent is Chinese. A lot of people move around for all sorts of reasons; spouses, boy and girlfriends, vacations, special assignments, etc. None of that is illegal. Nor is spying that doesn’t involve break-ins and other illegal activities. So I don’t know what we can do about rumors like these.”

“What can we do about the atmosphere, Will?” pressed Enlai.

Will took another sip of the tea. “Give me a sol or two; I have to talk to the Prince, meet with a few influential people like Érico and members of the Council, and plan what I need to say.”

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Will began to talk to various people on Mars and Earth and soon threw himself into a plan that took on a life of its own. Érico had little to offer; Will was surprised to find him detached and seemingly distracted, but he refused to offer any details. Madhu and Roger were also quiet. But Father Greg was full of ideas; Yoshiyaki Suzuki, the head of the Zen

monastery up on the escarpment, was very encouraging; Ruhullah was passionate, even opinionated, about the subject; Reverend Nah was cautious but supportive. The meeting with Prince Bilal was extremely difficult because he refused to admit to anything and spoke very positively about Will's ideas even though they contradicted everything Bilal had apparently done.

The conversation with terrestrial advisors—Louisa Turner and Pierre Messier especially—was slow and frustrating. Any time Will issued a statement about anything, it received media coverage and therefore had the potential to derail the Commission's "message"; in the last year it had been the fifteen-year immigration plan and nothing else. So anything Will said had to relate to that theme somehow, which was difficult.

Resolving nuances and emphases at a time when round trip communications between the planets took forty minutes was tedious, especially when Will insisted that videomail be used instead of email; he wanted everyone to see each other's faces when they spoke. Eventually Will told Louisa and Pierre they'd have to trust him to finalize the wording.

He scheduled his address for 1 p.m. Aurorae time, which was the nearest thing Mars had to a prime time, because at Dawes and Cassini it was 6 p.m. and everyone was in the cafeterias eating. He ate his lunch early so he could polish; when he showed up at the Gallerie at 12:55 p.m. he was pleased to see that most people had stayed to hear him.

"Good sol, my fellow Marsians," he began. "In recent weeks our thoughts and prayers have turned toward Earth and the intensifying struggle there caused by terrorism, scarce resources, and shortsighted conceptions of national interest. We worry about our relatives and friends struggling to find work, make ends meet, or grieve over recent losses because of the flu pandemic. We fear for their future. We are pained by the suffering in

our home countries and wish we could help. We despair that humanity will ever achieve a stable, peaceful, fair, and prosperous society.

“In our love and patriotism for our native lands it is inevitable that we will understand our home country’s plight better, and the positive side of its claims and actions more deeply, than the plights and positions of other nations. An international public opinion barely exists. An international media with an international perspective is very difficult, if not impossible, to find. As a result a truly neutral and unbiased position on the events of the last year is virtually impossible to find or achieve.

“The consequences here on Mars of this lack of international perspective have been alarming. Friends from different national backgrounds have strained conversations or must avoid many topics. Rumors about certain nationalities on Mars and their motivations or alleged activities are whispered from person to person. Many persons feel uncomfortable or stared at when they eat in public places. Under such circumstances, people withdraw into culturally and linguistically familiar groups, increasing the level of social segregation among us and potentially fostering additional suspicion.

“The danger of these trends is that Mars could fall into the same patterns and alienations that Earth currently is torn by. The strength of our society is that we are truly international and multilingual. No one nation can claim more than twenty percent of the residents here. We are almost as diverse as Earth itself. Yet unlike Earth we are united. We share a common legal and governing system based on democracy and free expression. We tolerate and nurture cultural and religious diversity and expression. We have so far avoided divisions, partisanship, and self-centered advocacy. And we share a powerful vision of a future nation rising on the Red Planet that will lead humanity

forward and be an example to Earth of what the full diversity of our species can accomplish when working together.

“Heretofore we have been small, almost insignificant in numbers. Yet we are now growing in size more rapidly and our capacities are increasing in leaps and bounds. The time has come, my fellow residents, to begin to provide the internationalist perspective that humanity badly needs. We are sixteen hundred individuals who can cross national boundaries better than any other group alive. We can understand each other better and can dialogue together better than any other internationally diverse group. And our effort has captured the imaginations of millions of people on earth.

“Rumor mongering and suspicions about each other are traits opposite to those we should exhibit now. Let the Chinese and the American extend to each other the hands of fellowship. Let the Pakistani and the Indian, the European and the African, rejoice in their common humanity. Let the various nationalities here plan ethnically oriented evening meals and programs here in the Gallerie, so that we can all celebrate each nation’s culture and all of us can express solidarity with each nation’s peoples. Let us talk to our cousins, loved ones, friends, and acquaintances back home about the shortsightedness of nationalism and the fundamental need for dialogue and discussion. Let us encourage them to submerge nationalism in the ocean of humanity. Let us educate ourselves in the human perspective on each issue and share it with others on Earth, so that we can counteract narrow mindedness with broad mindedness.

“Can we play a role in helping humanity pull itself back from the brink of chaos? We don’t know, but we have an obligation to try. What’s in it for us? Certainty, for chaos and instability breed uncertainty over the future and pessimism over humanity’s ultimate

destiny. No one should think that Mars will benefit if certainty on Earth collapses and the price of gold triples again. The material gains for Mars will be far exceeded by our psychic losses. Our future is tied to a stable, prosperous, peaceful, just Earth, and we have means and capacities for hastening that day. Devoting ourselves unitedly and together to helping humanity overcome its divisions is some of the most important work we can do today. Thank you.”

The Gallerie was rocked by a burst of powerful applause. Several people stood, then more, and in seconds the applause became a standing ovation. Will stepped down from the podium without a comment and headed straight for Enlai. Progress was slow because many people wanted to shake his hand, thank him, or comment about his speech.

Enlai came to him as well. “Will this do it?” asked the commissioner. The Nobel Prize winner nodded.

“I think so. You haven’t just told us to stop being prejudiced against our fellow Marsians; you’ve diverted our energy in a positive direction.”

“Only if we follow up on the address. I want a series of televised dialogues between Marsian-Americans, Marsian-Chinese, and other ethnic groups. Of course, millions of prejudiced people won’t listen to them, but we’ll exert some pressure on the media and we’ll preach to the converted and strengthen their resolve, perhaps even give them new arguments. I’m organizing a series of twice-weekly ethnic evenings here in the Gallerie. The Commission’s paying for the food; we’ll feed everyone for free.”

“Really?”

Will nodded. “I think that’ll get the eating establishments on board! But I need the Marsian-Chinese to help for their night.”

“You can count on us, I’m sure.”

“Excellent. We need to tie the evenings into the immigration plan, too; highlight each group’s contributions to Mars and to Earth and emphasize why we need more of them up here. The best way to fight biases is indirectly. No one likes to be lectured at; they’d rather be reminded subtly, entertained, and educated.”

Enlai nodded; Will turned away to speak to someone else. Then he spotted Érico and Roger working their way toward him. He walked over to them.

“How was it?”

“Excellent,” replied Érico. “You’ve laid out quite a plan.”

“We’re going on the offensive as a people against the prejudice and narrowminded nationalism on Earth. It’s the best way to overcome our own blinders. And if we do it right, we help forge a Marsian identity.”

“And lay a foundation for a transnational perspective on the conflict,” added Roger.

“‘Transnational’: that’s a good way to put it. Will you participate on a television program with Enlai?”

Roger hesitated the briefest of moments. “Sure. That’s a good idea.”

“But there’s another matter we thought you should know about,” said Érico, lowering his voice because of the crowd. “Sammie and Corrie are going to have a baby.”

Will was startled. “When did you find out?”

“Five sols ago.”

“It’s been a rough five sols,” added Roger.

“I bet; an emotional rollercoaster.” Will considered. “I’ll share that with Louisa. But this isn’t public information.”

“Correct,” said Érico. “We want this to remain private as long as possible.”

“What are they going to do? Corrie’s barely seventeen.”

“We don’t know. There’s no reason to rush to a decision; the baby isn’t due for six and a half months. The kids need our support right now to make a bunch of big adult decisions,” said Érico.

“That’s hard. They’re getting counseling?”

Érico nodded. Roger added, “And it hasn’t always been so helpful, either.”

“They’re learning, too,” replied Érico.

“They’ll be in my prayers. Let me know when I can offer them verbal support. But that shouldn’t be a problem for this campaign. If anything, it’s a challenge to our community; when the kids need support, the community has to come through for them.”

“We didn’t want you blindsided,” said Érico. “Let me know what the Mars Authority can do to support your initiative.”

“Let’s get together and come up with some plans. I’m sure the Mars Authority can do a lot.”

Will watched the entrance of the Gallerie for Father Greg, Ruhullah Islami, Reverend Tuesday Nnah, Ananda Thanarat, Yoshiyaki Suzuki, and Prince Bilal to emerge from their television program. He, Ethel, and Lizzie were sitting at a table in Andalus Square eating dinner. When the representatives of Mars's organized religions appeared, he rose and walked over to them. "How did it go?" he asked.

"Very well, I think," said Greg. "The questions were good ones."

"And our answers about peace and reconciliation all reinforced each other," added Ruhullah. "But who knows whether it'll do any good."

"Every little bit helps," replied Will. "The interfaith service this Sunsol will be broadcast as well."

"Every Sunsol for the next few months," replied Tuesday. "Some of us have to rearrange the schedules of our regular services. But it'll be worth it, if we can get religious people across Earth to think about peace."

"There are compromises that are acceptable," added Bilal.

"Let's pray for an audience!" exclaimed Ananda.

"You'll have an audience," Will assured them. "Excellent. I'll see you on Sunsol."

The others nodded, exchanged goodbyes, and headed across the square in various directions. Will sat with Ethel and Lizzie again. "Do you really think we can change Earth?" asked Liz skeptically.

“We’ll have an impact; the question is how large it’ll be.”

“There’s a negative impact, too,” said Ethel. “Countries could react and take more intransigent positions. They could also retaliate financially.”

“That’s a risk we have to take. Fortunately, the Chinese commitment looks rock solid. That means the United States and India are likely to keep their pledges as well.”

“Competition,” said Lizzie. “Oh, by the way, I got a video message from Marshall as I was leaving my job at day care. For some reason he had to be measured and he discovered he’s a half centimeter shorter than he was on Mars! He was pretty upset about it, too.”

“Gravity will do that,” agreed Ethel, chuckling. She glanced at her watch. “I’ve got to go back to the carbonyl plant for a few hours. You have to be in bed by 10:00, Liz, it’s a school night.”

“I know, mom, don’t worry.” Lizzie rolled her eyes.

“You’ve worked a lot of extra hours, lately,” observed Will.

“It’s our contribution to advancing this place,” replied Ethel. “That’s one reason output is up thirty percent.”

“I’ve got to head back to the office,” said Will. “It’s morning in Paris and I have calls to receive or make.”

They all rose from the table, bussed their dishes, and headed out in various directions. Will pondered the view momentarily before headed for the Commission’s building; the dust-shrouded disk of the sun sent curry-colored rays across crowded Andalus Square. Dust storm season was a time of unusual lighting, sometimes almost normal in intensity, sometimes depressingly dark and brown.

He found several messages waiting for him, two marked “urgent.” One was from Pierre Messier, but when he activated it, he saw Louisa and Pierre sitting behind Pierre’s desk side by side.

“Good sol. Will,” began Pierre. “We have quite a political scramble down here. Poor Krister’s flying from capital to capital in order to maintain support for us; most governments are furious we’re meddling in terrestrial affairs, even if we aren’t taking specific positions about specific situations. The general principles—keep talking, search for compromises, don’t inflate the public anger at the other side—have been enough! But even if we lose some government grants, we’re financially set for a big thirteenth columbiad. The price of gold and PGMs has gone up. The high-tech industry, hit hard by the recessions, is charging less to get our business. Lunar tourism has taken a sharp dive, so everyone with a Swift shuttle wants to fly our people and our cargo to orbit. So as of today I think we can safely commit to the maximum passenger load we planned: a total of 700 arrivals. The latest update of the purchase of passenger slots shows that Consolidated is flying in twenty, Muller Mining twenty-three, Sibireco twenty, Deseret twenty, Green World Community ten, Church of Jesus Christ and the Creator eleven, New Tokyo twelve, and New Iran ten, for a total of 126. The Chinese government has pledged thirty for its facilities and the U.S., thirteen for New Hanford. Incredible; 169 immigrants sent by other organizations and governments! On top of that, we have dedicated funds from governments to fly up sixty citizens of their countries, but as Commission employees. That doesn’t include the American, Chinese, Indian, Russian, and European commitments to support our 15-year immigration plan, most of which will be finalized in

the next half year. We'll have 150 on our waiting lists and they won't find out whether they're flying until their national subsidies are finalized!

“So I guess the news is both good and bad. Louisa will update you about public relations.”

“The polls of forty leading countries show that the public is still learning about our campaign,” said Louisa. “About half the public is still unaware of our effort and the other half is split. This is a hot button issue, Will. A fraction of the public thinks that if we want to lecture them about how to run their countries, we don't need their government's money. Another fraction hold the opposite position: that we're right and the situation on Earth is crazy. But they don't necessarily feel our subsidies should be increased, and in many cases they feel money should be spent on social problems rather than on space. So overall this campaign has started to erode public support for us and is raising our negatives. This is especially true in the U.S. and China; our campaign is viewed more favorably in Europe and Canada, but even in those places there is substantial negative perception. We're not going to be viewed as the cavalry, coming to lead the governments of the world toward sanity; more like the Keystone Cops.

“So again, I urge that we redirect this campaign. The ethnic evenings at Aurorae make good media in the nations involved and they build relations on Mars, so they work. The Marsian religious leaders dialoging look good. The reception of astronaut-heroes on local television urging a more conciliatory approach to the world is somewhat more effective. But the Commissioner lecturing nations about their behavior or facilitating discussions between Marsian Americans and Chinese don't seem to do much.”

She looked at Pierre, who said “Back to you, Will.”

He had heard the objections to the media campaign before; Louisa, in particular, had been opposed to the Commission becoming involved in terrestrial matters. But she was conveying polling information, and he could count on her to give him a fair presentation of it. He hit reply.

“Pierre, thanks for the update. I’m glad we’re able to import 700 new folks next opposition. We need more technicians and regolith processing specialists in order to expand platinum-group metal production. That’ll help. I’ll suggest to Krister that he use some of his contacts as Sweden’s former foreign minister to see whether he can serve as a conduit of communication between the United States and China. He might be in a good position to help, especially since he has an excuse to shuttle back and forth.

“Louisa, my series of conversations is over, so let’s not plan a second series. Érico has a conversation with some folks up here, but it’ll be taped in Spanish; it should proceed. If our campaign is proving to be counterproductive, it is not successful. What can we do that will be effective, within our capacities? Think about that. The dinners and the roundtables seem to have worked pretty well to eliminate suspicion and unease. The Chinese tell me they’re feeling more welcome. Of course, like most people here, they’re wearing Marsian flags on their clothes!

“Let’s consider what *will* work to reduce the danger of a serious war and an economic disaster, because those are certainly against Mars’s interests, as well as being against the interest of humanity. It’s not just a matter of sticking to a media strategy oriented around our needs over the next fifteen years; sometimes we have to think big and deal with a serious danger to humanity as well, recognizing that what’s bad for Earth

is bad for Mars, too. What we're doing is not against our vision for Mars, it's just dealing with a different aspect of it that can't be ignored. I hope that helps. Bye."

He sent the message, knowing that he would have to repeat the point to Louisa and Pierre again and again to make sure they stayed on board. He checked to see whether Krister Soderblom had sent a report. He hadn't. He had to talk to Krister about the talking points he was following. They had to be broadened.

He was intrigued to see David Alaoui had also sent an urgent message and turned to it next. David looked fresh and energetic as his face appeared on the screen. "Good sol, Will. I can't tell you how moved I was by Tina Hvitmer's interview of you, Roger Anderson, and Enlai Tang. It was broadcast last night in French—with all your voices synthesized in translation—and I am sure it was very well received by the French public. But then, Europe is the most receptive continent to your message of peace, reconciliation, and compromise. We've reconciled and compromised our way into this Union and have strengthened and expanded it that way for fifty years! We didn't like the U.S. invasion of Turanistan eight years ago or their invasion of Khaliestan two years ago. We want them to be true to their principles and accept the Khaliestani elections, and we are amused that Chinese troops have been requested to replace the U.S. peace keepers. And if there isn't enough oil to go around, let's ration it while replacing it in our energy supply; Europe's way ahead of the rest of the world in solar and wind power.

"This may explain the very enthusiastic reception of your interviews and talks both at Magellan Station and Concord Station. Of course, most of the personnel are European and most of them have spent time on Mars. Both stations have only small numbers of American and Chinese staffers. The folks on Mercury have been purchasing

land there and a few are settling in for the long haul. So they are feeling very much like the Marsians, though with only twenty-four people at Concord, they're way behind Aurorae. They want to plan a broadcast to the peoples of their twelve countries and I have approved the decision. Can you send us your talking points? Your approach is an excellent model. I wouldn't be surprised if the staff at Magellan want to do the same thing. The Venus-Mercury Commission won't oppose them; we want to make a contribution toward ending this crisis.

“Last night I called Rick Page at home, hoping he'd be more informal and frank. He told me that the Lunar Commission simply could not plan or encourage similar efforts by lunar personnel. Too many of them live in the Houston area, are embedded in American culture, and have taken sides in the crisis. Apparently foot traffic in the tunnel connecting the Chinese Station to the international Station at Shackleton has dropped to a minimum. My hunch is that LeMonnier Station, however, will be supportive of our efforts. They're mostly Europeans and Russians, after all. I'll call them.

“It's a courageous thing you're doing, Will. I don't know whether the effort will succeed, but it's worth a try. Bye.”

Will hunted around to find the message with the talking points. He attached it to his reply. “David, it's really good to hear from you. It was well timed; the resistance and the risks are wearing me down. I'm attaching our talking points. The guidelines are simple; no criticizing specific political parties or politicians, stress the points where compromise is possible, be positive, stress our success in communicating across cultural barriers. Support from Mercury and Venus will be very encouraging. As for Rick, I'm

slowly and delicately working on him. He's in a very different situation. Just keep the lines of communication open. Bye."

He sent the message, feeling much better. He ran to the Lunar Commission's website to check the statistics: Americans and Chinese were twenty-five percent and fifteen percent respectively of the 300 people currently on the moon. Mars was twenty percent and ten percent respectively, but since the people were long-term residents they mostly thought like Marsians. In contrast, the Mercury crew was ten percent American and five percent Chinese. Venus was even less. The last six months had been very difficult for the moon; the economic uncertainty had killed the tourist market.

He turned to the dozen other messages in his box. Bruce Cowdrey had updated him about the plans for manufactured housing; the crew had started by manufacturing the factory itself, a metal box fifty meters by seventy meters and eight meters high. Sheets of nickel-steel were literally as cheap as water and came in sizes up to ten meters by twenty. Cowdrey had purchased a used crane and four new robot welders. The factory would be airtight and ready for burial under three meters of regolith in a few months.

The other messages were routine. Most were details about personnel requests for reassignment or appeals of previous denials of such requests. Ten months had passed since the first 250 arrivals of the twelfth columbiad had landed, and many were trying to get out of dead-end or boring jobs that had gotten them to the Red Planet. But someone had to do the other work, so many requests were denied until the thirteenth columbiad brought replacements. The number of requests this year was unusually large, partly because as Earth sank into deeper economic troubles one of the first Mars subsidies that got cut was robotic research. Labor unions, watching unemployment creep upward,

tended to fight automation fiercely, knowing that innovations for Mars inevitably would be introduced on Earth a few years later.

Will authorized his robotic secretary to write several of the people appealing and send them a list of possible appointments. They'd get half an hour to make a direct appeal to him and he'd lecture them about doing their duty for another year. It was rare he approved any of the changes.

He turned next to a duty that was often unpleasant; videomailing Earth politicians about their countries' pledges. Krister Soderblom had sent him six requests for messages the sol before and he had to make that a priority before conditions changed. He was about to review the talking points and record a message to a United States Senator when he heard a knock on his door. He looked up. It was Yuri Severin. "Yuri, good sol, come in."

"Thanks. How are you doing this sol?"

"Alright, I guess. The pressure is on right now."

"I bet. I was surprised you were so explicit in your television appearances."

"Perhaps it wasn't wise. At least the momentum toward war between China and the U.S. seems to have stalled."

"For now, anyway. Well, keep it up."

"I suppose we will. Sit down, How can I help you?"

Yuri sat and sighed. Will came around from behind his desk and sat in an easy chair next to Yuri. "We've got big problems with the Emergency Corps. The new arrivals are idealistic and are willing to work extra hours to earn money, so we have a lot of new people signed up. But every time we run a training course, the Safety Office toughens the

standards and the certification becomes outdated. So we schedule another class to update people and within a few months something *else* changes. It's damaging morale."

"How often is Rachel changing things?"

"Every few months! We have no one completely trained yet in everything because classes have to be rerun. My people are getting frustrated."

"Have you tried talking to Rachel?"

"Yes, but as usual, it does no good. She won't inform me when a standard might be revised or how."

Will nodded. "I wish I had some control over her, but she works for the Mars Authority. It's been a problem. Have you talked to Érico?"

"No. I'm not sure what he can do."

"I'll talk to Érico. Maybe I can arrange a four-way meeting."

"Do you think she'll agree to it? She's very prickly over the independence of the Authority from the Commission where safety is concerned."

"I know, but it's worth a try. We've had to change the plans of several expeditions because she toughened the safety standards during dust storms, which have narrowed the times when we can use aircraft to rescue someone."

"That one really hit our plans hard, because she's blacking out all flights even in category 3 storms."

Will nodded. "And stopping all surface exploration as well. She's probably right about that one, Yuri. We've been too optimistic about the risks."

"Perhaps, but it means a quarter of a typical Martian year is now under a travel ban."

“I know. We can live with it.”

“Okay, if you say so.” Yuri rose. “Let’s meet with her. I’ll have a report for you next week about the confusion we’re dealing with.”

“Thanks.”

Yuri stepped out and Will watched him go. Yuri Severin and Rachel Evans had been at loggerheads for two years. It was a problem he would have to address.

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That Frisol the Gallerie was decorated for Middle Eastern night. Large paper murals attached to the walls showed a mountain of rock rising above a dunescape, which in turn was visible through a screen of oasis palm trees. The Moorish arches of the Gallerie’s entrance, decorated by geometrical patterns in bas relief just like the molded plaster art of Moorish Spain, had quotations from the Qur’an pasted above them; it made the arches look more authentically Islamic and, for many, more foreign. A large view of the Grand Mosque in Mecca with the kaaba in the center decorated one wall and attracted a steady stream of visitors wishing to examine the scene in detail. A banner stretched over the center of the Gallerie had a Quranic quotation about hospitality in Arabic and English.

Most of the eateries featured Middle Eastern dishes that night. Prince Bilal ibn-Majid Abbas, head of the Khaliestani community at Aurorae, bustled around the area supervising the plans and greeting people. When he finally reached the head table, where Will Elliott invited him to sit, many were finishing their meals.

“Prince Bilal, this is a marvelous evening,” said Will. “The food, the atmosphere, the hospitality; you’ve done a marvelous job. Thank you.”

“I appreciate your kind words, Commissioner Will. I wish the crowd was larger.”

Will looked around. The Gallerie was a bit less crowded than usual. “This is not too bad. I think the crowds have been shrinking in the last two months, don’t you? More people have microwaves in their flats, and the food places are selling frozen foods or prepared foods to go, so more people are eating at home.”

“Perhaps true,” replied Bilal, sitting at his place to Will’s right. Ethel sat at Will’s left, then Lizzie and Sam; on the other side of the table sat Ruhullah Islami, his new wife Nadia Larui, Roger Anderson, and Madhu Gupta-Anderson.

“The food was excellent tonight,” exclaimed Roger. “The lamb has been a treat.”

“This was the first time roast lamb was prepared on Mars,” replied Bilal.

“There’s going to be a separate Iran night, right Ruhullah?” asked Madhu.

He nodded. “Yes, there are twenty Iranians on Mars, and we’re already planning the decorations and cuisine; Iranian cooking has some excellent and unique dishes, not to mention music and art that we’ll highlight in the program afterwards.”

“Almost as large as our Arab community,” exclaimed Bilal, with a smile. “Our program tonight will be quite diverse as well.”

“Belly dancing is included, I understand?” said Roger.

“Yes,” replied Bilal delicately. “It seems like a contradiction of our Islamic teachings to many, but the Middle East has had diverse cultural expressions for thousands of years, and they don’t all fit a conservative form of Islam.”

“We’ll also have several love songs in Arabic,” added Nadia, a physician from Tunis and a fairly secular Sunni Muslim. “They’re not part of strict Islam either, but they are very popular all across the Arabic world.”

“But your wife isn’t here,” noted Madhu. The seat across from Bilal was empty.

“No, she didn’t feel it was an appropriate place for her,” replied Bilal.

“Why not?” asked Nadia provocatively. The Khaliestani women appeared in public covered from head to toe, and if their husbands weren’t with them, a robotic chaperone rolled along next to them.

Bilal looked at her, irritated. “As you know, Dr. Larui, there are various Islamic understandings of the role of women in society.”

“Indeed there are. I’m so relieved that here on Mars we have the freedom to choose our path.” Her voice rose slightly. She was dressed modestly by Marsian standards, with a dress that went to her knees and past her elbows, but her beautiful black hair was uncovered and luxuriant.

“No outside authority here will force people to conform to standards,” Bilal replied, looking at Ruhullah rather than Nadia, as if to imply that the husband should discipline the wife.

“Indeed; we live and work in a society that is secular and pluralistic,” agreed Ruhullah, putting his hand on his wife’s shoulder.

“I think these cultural evenings have been a very pleasant and illuminating addition to our life here,” exclaimed Ethel, changing the subject. “The American evening got a smaller turnout than this one, Prince Bilal, and I think many people felt a deep ambiguity about an evening devoted to American foods and art.”

“That’s true,” agreed Madhu. “The Chinese evening as well. The Indian evening had that problem for the Pakistanis and Burmese. Anyone who has felt dominated or oppressed by the spotlighted culture has felt uncomfortable. So this evening is a chance for people to feel a bit more comfortable with the Middle East and Islam.”

“I hope so,” said Bilal. “It was a good opportunity for the twenty-two Arabs here to get organized.”

“That should be a positive result of this effort also,” agreed Ruhullah. “The various ethnic communities here are better organized than ever before.”

“It has only been possible for a few years,” added Will. “Four years ago Mars had four or five Arabs and three Iranians. Now there’s a critical mass. I just hope that the organizations remained dedicated to positive contributions to Mars.”

“And not ethnic competition,” agreed Ruhullah.

“I want to congratulate you on something, Commissioner,” exclaimed Bilal. “I suspect the Commission’s efforts to call for peace have helped cool the atmosphere on Earth. Certainly the developments of the last few sols are positive.”

“Indeed,” agreed Will. “And I’ll share a little secret with you; well, it isn’t really a secret. Krister Soderblom has been traveling all over the world shoring up support for our immigration project, and it has provided him with a chance to listen to governments and share ideas with them. He was able to play a role in carrying ideas about the current compromise, where the U.S. troops in Khaliestan will be put under the United Nations flag and will be gradually phased out by other troops, including Chinese troops, also as part of the U.N. peacekeeping mission.”

“It’s an excellent plan,” exclaimed Bilal. “And a perfect compromise.”

“And I think the U.S. will accept it,” added Roger.

“It’s hard to believe this crisis is finally clearing up,” said Ruhullah. “It was beginning to look intractable.”

“It was,” agreed Will. “Our role was small, but perhaps a small role was enough to tip the balance. That doesn’t mean our effort is over, either. The Earth is now dominated by a cold peace rather than a cold war.”

“Here, here,” said Madhu. “Energy problems, in particular, need more systematic international effort.”

“It’s beginning to look like the United Nations will play a bigger role, too,” said Will. “There’s serious talk about U.N. reform again. In the last twenty-five years there have been three serious international economic crises with huge currency fluctuations, a huge expansion of terrorism, a growing gap between rich and poor, and a lot of unnecessary suffering. Greater coordination and integration could solve these problems.”

“It’s the nationalism,” replied Madhu. “We can see that more clearly up here.”

“Selfish, prideful nationalism,” added Ethel. “And it’s mistrust; that’s harder for us to do much about.”

“It’s hard enough to work on mistrust up here,” added Ruhullah, eyeing Prince Bilal.

“And on that note, I’m getting some coffee,” said Will. He walked to the coffee and dessert area. Sammie followed fairly closely on his heels; Corrie had headed for the desserts as well. While Will got coffee and baklava for Ethel and himself, Sam and Corrie nodded to each other and chatted briefly. When Will was ready to head back to the table, he turned to them. “How are you guys holding up?”

Sam was startled a bit; he didn’t know Will knew anything. But Will’s tone had been sympathetic. “We’re doing okay, Uncle Will.”

“Good. Let me know if I can help in any way, okay? Because all of us want to make things a bit easier.”

“Thank you,” replied Corrie. “The counseling is helping a lot. My head’s finally beginning to clear.”

“Good,” said Will. “You’re in my prayers every morning.”

“I appreciate that,” said Sam.

“It was an accident,” Corrie added.

“And we all make mistakes.” He patted her on the shoulder. Then, not wanting to embarrass them too much in public, he headed for his table.

“Hey Will,” exclaimed Yevgeny Lescov, who was approaching the dessert table. He came close and spoke quietly. “I got a call from a geologist at TROV control late this afternoon. He was running a Prospector-120 in the Uzboi Valles area, just south of Holden crater. The catastrophic floods obliterated an early Noachian crater about seventy kilometers in diameter; the crater has no name and doesn’t even appear on maps because there’s so little of its rim present it’s almost impossible to identify. The Prospector found part of the original impactor, a chunk of nickel-iron about fifty meters by thirty. It has several hundred thousand tonnes of metal.”

Will whistled “That’s pretty big. What sort of nickel-iron?”

“Ataxite; the nickel content is eighty percent.”

“Wow! That’d be enriched in platinum-group metals!”

“Yes, probably about eight times normal, in which case the ore body has twenty-six tonnes of PGMs. There are nickel-iron fragments all around the area, too.”

“What would be the size of the original impactor? A kilometer?”

Yevgeny nodded. “About that, to make a seventy-klick crater. A sphere 1,000 meters across would have a half billion cubic meters of volume; at a density of six, that’s three billion tonnes of ataxite; divide by about 5,000, and that’s 15 million tonnes of PGMs.”

“Wow. Of course, most of that was blasted to pieces by the impact.”

“True. The alluvial deposits in Tiu Vallis have ataxite fragments all the way down into Chryse and we wondered where they came from. No doubt there are multiple sources. Some of the impactor has been washed half way across Mars, but a lot should be left in Uzboi. Let’s say one percent is left; that’s still 150,000 tonnes.”

“Wow, that’s amazing,” said Will. “I’d pursue the matter all weekend.”

“We will,” promised Yevgeny. “I’ll have a preliminary report for you by Monsol. We have good aerial remote sensing coverage of the area. And I’ll alert Alexandra.”

“Definitely. If this find really is big, we’ll need to send out a big team.”

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On Monsol morning, Will’s office was crowded. Yevgeny and Alexandra Lescov were there; Roger Anderson; Yuri Severin; Eve Gilmartin; even Érico Lopes was invited.

Yevgeny had a meter-square piece of electronic paper on the table in front of them, and with the push of a few buttons a big map of the Uzboi Valles area appeared on it.

“You can’t see the crater any more unless you know where to look,” said Yevgeny. He touched the map with a magnetic pen and drew a line on a series of small hills that defined the remnants of a rim.

“That’s good sized,” said Roger.

Érico nodded. “The Argyre Sea drained through it, washing most of it away and making Uzboi Valles. Then farther north, Holden crater formed and dropped ejecta over the area, damming any floods, then Uzboi cut a smaller channel through the ejecta and breached Holden. . . anyway, to make a long story short, the bulk of the nickel-iron impactor was exposed by erosion.” Yevgeny pushed a few more buttons and a series of red lines appeared, which often wrapped so tightly together that they formed splotches and dots. “Thank God for fifty years of remote sensing; we know this world better than we know the Earth. This is the magnetic anomaly map of the area. We ran the data through the supercomputer yestersol, with the spectral reflectance map. . .” He pushed another button and some yellow splotches appeared, which mostly overlapped with the red splotches, making orange. “And seismic data, which shows buried bodies of high density.” He pushed another button and some blue objects appeared. They usually did not overlap with the yellow, but overlapped with magnetic red spots, forming purple. “So here we have surface exposures of nickel-iron in orange and buried bodies in purple; about a hundred million tonnes on or close to the surface and 300 to 400 million tonnes underground.”

“How much platinum?”

“A hundred fifty parts per million, so the hundred million tonnes have 15,000 tonnes of PGMs, with three or four times more within a hundred meters of the surface.”

There were several gasps in the room. “It was inevitable we’d find a body like this,” said Roger. “For all we know, there may be others, and they may be bigger.”

“Mars is covered with magnetic anomalies,” agreed Yevgeny. “We’ve already sampled several hundred. This is the first ataxite.”

“So, we’re going to have Uzboi Borough,” said Érico. “I suppose that’s why I was invited. The road building crew is busy in Acidalia working on the Polar Trail. It’ll be hard shifting to the Uzboi area, though, because of the dust.”

“That’s why I invited Eve and Yuri,” replied Will. “The Emergency Corps has been working on a mobile medical facility. Could it be moved to Uzboi?”

Yuri looked at Eve, who considered the question. “Yes, I think so,” replied Eve. “That would solve the problem of medical evacuation by air, which is impossible for the next few months. Is there a six-meter road all the way?”

“Not yet,” replied Will. “The outpost building team will have to be a road building team first. It’ll take several months to upgrade the Polar Trail and add a side road to the location of the Outpost, wherever we want to put it.”

“And I’m here to say we’ll build an outpost?” asked Alexandra. “How much lead time do I have?”

“I’d say three months,” said Will. “It’ll take that long to get the road there. We’ll want to move one of our new carbonyl fractionation towers and associated equipment; trucks, excavators, solar power units, wind turbines. Even if we run the equipment from here, we’ll need eight or ten people there to maintain it.”

“And more for the second fractionator, and the third. . .” added Alexandra. “We’ll need a growth plan. You’re talking about an industrial plant with the ability to produce 15,000 kilowatts of power within a few months. And since Uzboi has five times as much PGM per tonne as any of our other facilities, we’ll want a reasonably aggressive expansion plan.”

“I think so,” agreed Will. He turned to Yuri. “You want the job?”

“What? Develop the plan?”

“Develop the plan, oversee construction, and run the outpost.”

Yuri smiled. “Sure! Thank you!”

“It’s a good assignment, and you can do it,” said Will. “Let’s get the road builders back here as soon as possible to start widening the trail, with a mobile medical facility so we don’t have aerial evacuation problems. We’ll need a lot of fuel, so we’ll have to reallocate supplies; fortunately the dust storm season is looking average. In a month we’ll be sure how bad it is and how much surplus fuel we have.”

“It’ll be six weeks before the expedition can head south anyway,” said Érico.

“There’s a lot of planning to do.”

“Let’s make it so,” said Will.

19.

## Dedication

late Feb. 2060

The air in Aurorae's Hilo Bioarchive wasn't as warm as it had been that fateful afternoon in November, thought Sam, and the vegetation wasn't as luxuriant. A duststorm raged outside, dropping a drizzle of yellow-gray talcum on the dome, reducing the sun to a faint circle in the sky.

Sam looked at a whirl of dust sliding down the dome ten meters over their head. He glanced at the artificial waterfall they were sitting next to. "It sure is different in here now."

"It is," agreed Corrie, though she seemed to refer to their relationship, not the weather.

Sam picked up something in her tone of voice. "Our relationship has been changed forever."

"Maybe even ruined."

Her words hurt him. "Corrie, I . . . I think I love you!"

"Well. . . I'm sorry." She looked at him. "We can still be friends, Sammie. But this changes everything."

"I know." There was a note of desperation in his voice; perhaps a fatalness as well. "I wish we could go back to the way we were."

"So do I, but we can't."

“I know.” He looked at her stomach, which had a very small bulge. After four months the pregnancy was slightly noticeable, if one knew it was there. “Pretty soon, everyone will know.”

“They’ll just have to look at me.” Corrie nodded. “I can adjust to that. Eve’s right; the people who know so far have been really good, really supportive. If we bite the bullet and tell people first, we’ll be able to manage the reactions.”

“Most. Some people will stare anyway.”

“I guess so.”

“So, have you decided to complete the pregnancy?”

Corrie hesitated, then nodded. “Yes. I’ll have the baby and put him or her up for adoption. I can’t raise him; I’m too young. You’ve got school. Our parents are really too old to deal with a newborn; they’re willing, but it isn’t fair on them.”

“I think you’re right. I said to you I’d be willing to help raise a baby, and I meant it, but if we can’t get married it isn’t so practical.”

“And I won’t marry you, Sammie. Who knows, maybe five years from now I’ll feel differently, but right now. . . I just want to be friends.”

He nodded and looked down at the water. A tear formed in one eye; it was all so hard to deal with. He wasn’t sure whether he was upset by her rejection or by the loss of the baby.

“So. . . who will adopt the kid?”

“Eve says Ruhullah and Nadia are interested.”

“He’s older than our parents!”

“But they want kids and can’t have any. Eve said she’s still making discrete inquiries.”

“She also said she could find parents at another outpost!”

“Yes, but do you want that? Look, we can’t raise this baby, but depending on who the parents are, we can probably still *see* the kid occasionally. And that would be . . . a relief, to know he or she’s okay. For me, anyway.”

“I suppose.” He wasn’t sure how he’d deal with that challenge. What did it mean to be a father in a biological sense, and yet not be a father to a child? He still was dealing with the idea of being a birth father. “Mom and dad might freak out at the thought of their grandchild being adopted by Muslims.”

Corrie laughed. “I didn’t think of that. Sorry; that strikes me as a silly concern.”

“I know.” And Sam could see that was another reason a marriage with Corrie wouldn’t work; their views of life were too different. “How are you going to manage with school?”

“It’s going to be hard to salvage my grades, but I guess I have to knuckle down and try harder so that I can at least graduate in June. The baby’s due in August. I’ll stay at home for the summer to recover from the pregnancy. In September when Martech starts up, I should be able to start. . . though maybe I won’t go. I want to get away from here.”

“Where? Earth?”

“No. Another outpost.”

“Hum.” He didn’t like that idea, but it made sense. He wondered whether she was getting away from him, from the baby, from her parents, or from all of it. But he didn’t ask. The thought of working at Uzboi occurred to him.

He stood up. “Let’s walk.”

She nodded and they walked around the perimeter of the dome, slowing a bit as they passed the bamboo grove where they had had their indiscretion, listening to the tropical birds that occupied the biome in profusion, enjoying the bit of raw nature, a pale imitation of wild Hawaii a few hundred kilometers from the Martian equator.

They paused in front of the airlock leading to Andalus Square, then opened the door and entered. They passed through three doors blocking the short tunnel, then opened the last door and entered the bustling urbanity of Andalus Square. He turned to her.

“Thanks for the talk.”

“Sure. I’m glad we had it. Eve told me I should talk with you.”

“I’m glad we had it.” He hesitated, then leaned over and kissed her on the cheek. She smiled slightly, ambiguously. “Bye.”

“Bye.” He turned and quickly walked home in order to hide the tears.

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The gray overcast had lifted only slightly two sols later for the laying of the cornerstone of the Bahá’í House of Worship in Andalus Southwest. The entire Bahá’í community on Mars—which now numbered forty-seven, including six at Cassini Outpost—was present, as well as about a hundred-fifty guests. The two hundred people and their folding chairs completely filled the nine-sided patio twenty-five meters across at the center of the Bahá’í gardens. It gave one a feel for the capacity of the House of Worship that would go up around the patio, converting it into the floor of the devotional hall. The metal edges of the patio, with their threaded bolts sticking up and ready to receive the wall sections, were discretely covered by flower boxes.

The program began with prayers and texts from the Bahá'í sacred writings on the theme of "How to Live," a favorite interfaith theme on Mars. The readings were intermixed with passages from the Bible and Qur'an on the same subject, all in English. A small choir assembled for the occasion sang several Bahá'í hymns. Videotaped greetings from several Bahá'í communities on Earth were played. Then Ananda Thanarat, an Auxiliary Board member—a Bahá'í advisor—rose to address the crowd from the podium, which stood in front of a big picture of the design.

"Thank you for coming," he began. "We are here to rededicate this site to the worship of our Creator and to lay the cornerstone of the building to be erected on this spot. The temple will be modest in size, able to seat about 200 worshippers. Its nine sides will each have a large window and attractive geometric decoration in Martian pastels; the dome will rise twenty-five meters above the floor and will be filled with windows to let in more light. Because it is being erected inside an enclosure, it need not be designed for rain or wind; it will be light in weight and simple. The temple will also be filled with plants, bringing the garden inside the structure itself.

"Like all other Bahá'í houses of worship, this building has nine sides. Nine is the largest single-digit number and as such is considered a symbol of the concept of unity, the central Bahá'í principle. We are extremely excited to see our teachings take the physical form of a building because they seem ideally suited to the society we are building here. Marsian society is striving to achieve social cohesion and unity. It seeks equality of all people, regardless of their ethnic background or gender, just as the faith of Bahá'u'lláh does. It searches for truth through science, yet recognizes the wisdom of religious tradition; similarly, the Bahá'í Faith advocates the harmony of science and

religion. More than almost any other society ever created, it eliminates poverty and extreme wealth; the Bahá'í Faith teaches the end of extremes in riches. It is a society at peace and one that appreciates the oneness of humanity, two essential corollaries to the notion of unity. It is founded upon justice, a prerequisite for unity. It is a society striving to figure out how we should live, and it is arriving at conclusions often very similar to those in the texts we heard this sol.

“The last two decades have shown that the Bahá'í Faith is destined to play a large role here. Like Christianity and Islam, it arrived on the first ship. It has attracted converts here and is larger, proportionally, than on Earth. Consequently, this temple does not represent a beginning; rather, it symbolizes a new phase in the Faith's role in Marsian society. We are confident that its role will continue to develop and expand as this world grows. As always, we seek to collaborate with other peoples of faith and everyone of good will to advance human civilization while we improve ourselves and the Marsian nation in which we live. Thank you.”

Ananda stepped down. Ethel, Enrique, Will, and Kim rose and stepped over to the location of the future outer wall near one of the doors. Will carried a small silver box; sent from Earth, it had dust from holy places associated with both the Báb and Bahá'u'lláh, the religion's two divine messengers. The four of them took turns mortaring the box into a hole in the foundation.

“The temple is now built!” exclaimed Will when they finished. It was a symbolic statement, but the audience responded by applauding.

The choir rose and sang a popular Bahá'í hymn, then there was a closing prayer about unity and the program was over. Everyone rose and headed for the refreshment

table, which was set up in a corner of the dome near the tunnel to Andalus. Will saw that Prince Bilal was walking quite slowly and seemed impressed by the program. When he saw Will nearby he turned. “Thank you for inviting me, Commissioner Will. I almost turned down the invitation; after all, your prophet claims to succeed the Prophet Muhammad, peace be upon Him, and this is impossible, which makes your prophet an impostor and all of his followers blasphemers. I must be frank with you; I feel that you are religiously mistaken. But I am nevertheless impressed by the spirit of the gathering.”

“Thank you, Prince Bilal; your words move me. I am happy that the beauty of this place and the spirituality of the atmosphere have touched your heart. We didn’t invite people here to accept Bahá’u’lláh, but to work together to improve Mars. That’s what all our religious communities seek, is it not; to make this physical world better.”

“Indeed. You know, I knew one or two Bahá’ís in Khaliestan. They were very good, honest people. I much regret that our government pretended the Bahá’ís didn’t exist, then persecuted them when we wanted to appease the fundamentalists. Ultimately it didn’t appease the fundamentalists anyway.”

“No, they just demanded more.”

“Exactly. When will your temple be finished?”

“Less than a year from now. The construction is fairly simple. The metal work is being done by Cowdrey and the ornamentation by Afigbo. You must come see it when it is finished.”

“I will. And you must come visit our mosque; I will arrange it. The calligraphy is still being completed, but otherwise most of the work is done.”

“The Catholic and Protestant churches are nearing completion as well, and the Mormon temple will be started next year. It’s a sign of the maturity of our society that we now have so many places of worship complete or under construction.”

“And they are all peaceful toward each other, praise be to Allah.”

They reached the refreshments. Prince Bilal turned to Ruhullah to chat, which was also unusual considering one was Sunni and the other Shi’i. Will walked to Ananda and Ethel, who were standing a few meters away. “We think the program went pretty well,” observed Ananda.

“There was a beautiful atmosphere to the gathering,” agreed Ethel.

“Prince Bilal felt it,” agreed Will. “Maybe that explains his very positive reaction. He even expressed regret for the persecution of Bahá’ís in Khaliestan.”

“He did?” said Ananda. “Khaliestan drove most Bahá’ís out of the country and executed two of them. That’s amazing. What governmental position did he hold?”

“I think he was just a minister of science education. Khaliestan had about 5,000 princes before the revolution swept the family from power.”

“So he played a minor role,” said Ethel. “Maybe that’s why he can apologize.”

“And because the top hundred princes were all executed, so no one knows who is in charge of the family,” said Ananda.

“Perhaps.” Will looked around. “This is an extraordinary gathering. We have Father Greg; Reverend Nnah; Roger Anderson; Yoshiyaki Suzuki; Ruhullah Islami; John Hunter; representatives of the Hindu, Jewish Buddhist, and Green World communities; and Érico Lopes, who’s a humanist.”

“And many of them would not have prayed together five years ago. Even the Shi’i and Sunni representatives are talking to each other,” added Ananda. “Our society is growing more mature, perhaps. Diversity is working.”

## Equinox

Aug. 7, 2060

Corrie Lopes entered the Gallerie for lunch with some trepidation. There were too many people who could be there whom she didn't want to see. Even though the baby had been born two weeks earlier, she still hadn't adjusted to the end of her pregnancy. She had gotten used to people looking at her as she walked around the Outpost, her bulging stomach announcing her indiscretion; she had talked to Eve Gilmartin about it many times and had adjusted to the situation. But now the stomach was gone and people still seemed to look at her the same way. Perhaps it was in her head. She wasn't sure.

She looked around the Gallerie after entering. She was momentarily distracted by the decorations that had been set up since breakfast. A big banner that read "Happy Equinox 2060" was stretched across the Gallerie; the northern vernal equinox fell on August 7, four sols away. The stores had sales to encourage gift shopping, for many families exchanged presents on the equinox. Strings of holiday lights were being set up.

She quickly spotted the knot of high school students at their usual table in the corner of the Gallerie near MacDonalds, munching on sandwiches. Rich Stroger, 17, was the oldest, with a warm smile and a quick wit. He tended to energize sixteen year old Jake Dunbar, who was a trouble maker, like his father. There were three fifteen year olds and they tended to look up to Rich and Jake: Marie Deschanel, Patrick O'Hare, and Yuki Nagatani. Corrie would have classified all three of them as good kids a year ago, but now she wasn't so sure. She hadn't talked to the two girls in months; once upon a time they

had looked up to her, but now they tended to hang out with Lizzie. Jake waved to Corrie, but she turned away and headed for Deseret Cafeteria to get a sandwich.

When she came out, she briefly spotted Sammie, who had stopped at a place called the “Pasta Bar” across the Gallerie to get his usual lunch of lasagna. She avoided him and he pretended not to notice her. Talking together was painful for both of them.

She headed to the tables on the square; they were usually filled with Khaliestanis, Iranians, Koreans, Chinese, and a few other groups with whom she had little contact. Her mom was joining her there. But as she came out she saw a noisy circle of people gathered around Nadia Larui, who was carrying little two-week old Maryam. Nadia and Ruhullah had given the little girl a name that Corrie, Sammie, and their parents could appreciate and enjoy, rather than Heba, Nejiba, and other Arab names lacking biblical roots. Corrie couldn't help but slow and stare at the little girl and she felt tears of grief sting her eyes. Maryam had a nose like Ruhullah's, but it came from Sammie and ultimately from Madhu. She had fine, light hair like Nadia's mother and blue eyes like Nadia, but they came from Corrie and ultimately from her mom, Carmen. She was an alert little bundle of energy, her limbs in motion and jerking around as her brain learned how to control them.

Nadia spotted Corrie, smiled, and waved. She and Ruhullah were overwhelmingly grateful to Corrie and Sammie and were willing to give the birth parents and grandparents some time with Maryam, so long as they were present. Corrie waved back but kept on walking. It was still way too painful. Sometimes she wondered whether an abortion would have been easier and perhaps less painful.

She headed for a table about twenty meters from Maryam. Her mom hadn't arrived yet. She didn't want to wait or sit alone, so she headed home with her tray

instead. As she walked, one thought pressed on her: she had to get away. Perhaps the problem was in her head, but that was also an argument to get away. She needed to meet new people and be in a new environment.

But there was one problem: she was scheduled to start at Martech in a few weeks. The thought of sitting in familiar classes with professors who were old friends of her parents, with fellow students who knew her—sometimes for years—was too much.

Then it occurred to her that the Muller Campus of Martech was opening in Cassini in early September. The choice of classes would be limited. Some would be the same classes with the same profs as at Aurorae, attended via live television link. Others would be canned distance-learning classes from MIT, the Sorbonne, the Academy of Sciences in Beijing, or Moscow State University. But there would be some new classes, especially in biology and ecology, subjects she enjoyed. That was the solution: go north. She headed to her father's office to see what he thought.

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As Sarah Pannakar passed through the security in the basement of the Borough building, she wondered yet again why she wanted to see Robert Kampala for one last time. When Yuri Severin and Kent Bytown had asked her to visit Mars's most famous prisoner, before he had agreed to talk, she had refused. Now there was nothing for anyone to gain from the visit, and she wanted to see him one last time.

The latches retracted with a clank and the door swung inward ever slightly. She pushed on it and entered the jail area: two metal-clad cells, side by side, each with a simple mattress, chair, and table, and a bathroom area in the back in plain sight of any

visitors. The overhead lights were covered by an unbreakable kevlar shield. The cells faced an open area through heavy nickel-steel bars.

Robert was the only prisoner in the jail; except for one drunk for one night, no one else had been in the other cells for the entire twelve months of his confinement.

When she entered he stood up, surprised.

“Sarah. What brings you here?”

“I’m not sure. I just wanted to stop by and say goodbye, and since the equinox is coming up in three sols it seemed like a good time.”

“Oh, yeah, the equinox. A big event.”

“It’s a big holiday, and this year it falls on Thursol, so everyone’s taking off Frisol as well. How are you doing?”

He shrugged. “Prison isn’t what I had in mind for my life. I don’t see practically anyone. Father Greg visits once a week. I watch two hours of tv a sol and get an hour of exercise. I know Bytown and his deputy, Carter, pretty well. I don’t get to fix anything.”

“That must be hard.”

“Torture.”

“Robert, what did you think you’d gain from releasing flu virus here?”

He didn’t reply at first. “I dunno. If I was caught, I’d go down in history. I guess I succeeded there. If I wasn’t caught, I’d still be able to fix everything and anything all the time, and I’d have my own little secret.”

“But. . . you could have killed four or five hundred people.”

“Or even six hundred. I didn’t have to worry, I took the vaccine before leaving Earth.”

She shook her head. He looked at her and she could see not a trace of remorse on his face. “And now you face life in prison or execution.”

“Oh, they won’t execute me. They’ll be so grateful I was a cooperative prisoner on the flight back to Earth, I’ll get life. It’s a shame, too, because I could fix so many things. Amadeus would have been proud of me. I’ll come back and get another chance.”

She frowned, then remembered his claim to be the reincarnation of Wolfgang Amadeus Mozart. For a moment she was speechless.

“So, are you getting married?” he suddenly said.

“What? I’m considering it; I think next year. I’m really enjoying my work here. My first year is over so my salary has gone up and the worst financial scrimping is over. It’s a shame you aren’t able to enjoy Mars, Robert. It’s quite a place, filled with very friendly, warm, smart, hard-working people. I’ve even taking up hiking; we have a hiking club that explores the Little Colorado Canyon and its side branches and marks trails.”

“Good, I guess. I’m mostly following mayhem. Quite a terrorist attack in south China three weeks ago, eh? A brilliant way to commemorate the hundredth anniversary of Nagasaki, crashing a civilian airliner into a reactor and spreading radioactivity over an entire province, not to mention bits of Burma and Thailand.”

She was shocked by his response; but then, that was probably the reaction he sought. “Sorry you won’t get a chance to contribute to it,” Sarah replied.

“Who knows? There’s always another life here. Maybe I’ll be a crackerjack astronaut and explore Triton or something.”

“Perhaps you should worry about a hotter place?”

He scowled. "That's not very nice, Sarah, and you always struck me as a nice girl."

"Our motivations are so hard to understand, sometimes," she replied, with a shrug. She waved. "Good bye, Robert."

"You're going already?"

Yes, I'm afraid so. Good bye." She headed for the door. She turned as she was about to leave and looked back at him briefly. Perhaps he appeared regretful that she was departing. But it was brief and she closed the door. With a click the latch slipped into place, and she walked away from Robert Kampala forever.

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The Elliott household had a very happy celebration of the equinox. About 7 p.m., Paul and Jacaranda Nuri arrived. Will greeted them at the door and gave them both a hug.

"Welcome back to Aurorae, after all these months! Come in! Happy Equinox!"

"Thanks for inviting us, Uncle Will," said Paul. "It's good to be back."

"Haven't seen you for six months at least." Paul and Jacaranda came into the living room, where Ethel and Liz were waiting there.

"Welcome!" said Ethel. "You've seen quite a chunk of Mars, I guess."

"Some," agreed Jacaranda. She hugged Ethel and Liz. "How are you?" she asked Liz.

"Oh, great. Looking forward to starting at Martech in a few weeks."

"College; wow," said Jacaranda.

They all sat on three chairs in a corner of the living room. Will passed a tray of cookies around. "Chocolate chip; haven't had any in a long time!" said Paul, delighted.

“How was Ceraunius Tholus?” asked Will.

Paul smiled. “Quite interesting, as was Uranius Tholus. We found signs of pretty recent activity, too; a mere fifty million years ago, that is. Then we were pulled from the expedition to help with Uzboi and headed south up the Tharsis Trail; that was fascinating.”

“Uzboi was a pain for Paul,” continued Jacaranda. “At least he was mostly doing local mineral geology, not construction—”

“The field work wasn’t bad,” injected Paul.

“It was a boon to me, though. I managed a one-week visit to Ceraunius, which was all I could justify as a journalist. But his reassignment to Uzboi meant I could push for reassignment there as well, to be with my husband, and Uzboi’s a great place for a journalist to be right now.”

“Very exciting,” agreed Ethel. “Or it was, when the work was heavy and conditions primitive. I suppose things are improving now.”

“They still don’t even have basic luxuries like chocolate chip cookies,” replied Paul. “Supply lines have been overwhelmed. Quarters were primitive and overcrowded. We were safe, but packed together like sardines. Life support was running open cycle.”

“We’ve never mounted such a large construction effort so quickly,” agreed Will. “Once Polar Trail was widened to Uzboi, the robotic trucks never stopped rolling.”

“It’s been a pain dismantling an entire carbonyl fractionation tower here and moving it to Uzboi, too,” added Ethel. “But considering it can extract six times as much platinum group metals there, it’ll be worth the effort.”

“It’ll take only a month to make up for five months of lost production,” said Jacaranda. “And it goes into operation next month.”

“Did you invest?” said Will.

“And how!” exclaimed Paul. “Every redback we could scrape together! I think everyone there had invested; it lent the place a sort of gold rush atmosphere. It was strange, we all worked crazy, long hours, we were in cramped quarters, yet we were determined to get Uzboi set up and we all had fun.”

“It was a great story for a journalist!” added Jacaranda.

“I liked your coverage; you did a good job,” said Will. “I was pretty concerned about morale, so I asked Alexandra to pay construction workers time and a half for their regular hours and double for overtime, and to keep the assignment in Uzboi short.”

“That worked!” said Paul. “Many people stayed longer because of the pay.”

“And they’re putting a lot of the extra pay into stock,” added Ethel. “We poured a few million in as well. You should interview Silvio; he’s been going crazy managing all the investments. I think just about everyone up here invested. We raised half a billion redbacks from Marsian investors.”

“Half a billion!” gasped Jacaranda. “That *is* a story!”

“This place is getting pretty big and we have a lot of financial resources now,” said Ethel. “Platinum-group metals from Uzboi is the nearest thing to a sure bet you’ll ever encounter. In spite of Earth’s troubles, demand for them remains strong.”

“Even if the price tanked to a quarter what it is now, we’d make money,” said Paul. “I wish we had more to invest!”

“So does everyone on Earth. The value of stock is going through the roof,” said Will. “Uzboi will expand faster than any outpost. It’s sitting on too much potential wealth.”

“But some of the investment is being used for basic infrastructure, right?” asked Jacaranda.

Will shook his head. “The Commission’s paying for the housing, life support, and the cafeteria. The Mars Authority’s paying for widening Polar Trail. All work facilities and roads are being paid for by the company. Of course, the Commission and the Authority own big pieces of the company.”

“Will Uzboi solve Mars’s financial problem?” asked Paul.

“I think so because we now have the capacity to expand platinum group metal exports to levels we could never have imagined before. A decade from now we could be exporting a thousand tonnes per year. That would cover all our expenses even if the prices halve. We’ll have such economies of scale, asteroid mining will be delayed.”

“Is it true that immigration is going even higher?” asked Jacaranda.

Will nodded. “The first flights that leave Earth in late December will carry 150 people each rather than 125 and come here in 150 days rather than 180. We’re shifting fifty people from the later flights to the earlier ones because of the need to recruit more people to work at Uzboi. The thirteenth columbiad will see 750 arrivals.”

Paul whistled. “Incredible!”

“It’s becoming very hard to manage, even with the responsibility spread out among all these different organizations. Uzboi is causing all sorts of ripple effects, too. When you move sixty people from Aurorae to Uzboi it causes all sorts of shortages, even

if their responsibilities are the same. Temple construction has been delayed because the finished parts won't be available. Afigbo can't get construction materials for his housing work."

"He's now helping to build Uzboi," said Jacaranda.

"Yes, he shifted half of his operation to Uzboi, and the Commission paid big," said Will. "Cowdrey's construction company has shifted a chunk of its operation there as well. They're paying huge overtime and we're paying for it handsomely. They're making a good profit. Meanwhile, they've had to pay their workers here more to work longer hours, so the price of new housing has gone up."

"And inflation is creeping through the entire price structure," added Ethel. "We're too big to maintain a command economy, so big increases in demand produce inflation."

"I guess it's a sign of a maturing society," commented Jacaranda. "But it also means people here will be less happy. And have less to invest."

"Hey, life ain't simple," said Will. He finished his cup of tea and glanced at his watch. "It's 7:45; the sun crosses the equator in forty minutes."

"We've got time to see the temple; could we walk past it?" asked Paul.

"Sure," said Will. The five of them rose. They put on light jackets; Andalus was usually cool in the evening. They stepped out of the house's airlock and turned right in the tunnel, heading for Andalus Southwest. Will spoke to the door and it opened, admitting them into the Bahá'í gardens.

It was dark out, except for the pale light of a gibbous Phobos in the east and a few small lights along the main path through the gardens. They followed the path, breathing in the aromas of evening flowers, until they came to the temple. The outside structure

was complete; they entered through a door and walked around the empty interior, which was still unfinished. They sat and recited a few prayers by heart in the quiet darkness, then headed out of the temple and gardens for the square.

Andalus Square was packed with people; almost the entire Outpost had come to downtown for the “equinox passing” the moment the sun crossed the equator. This was the “Northward Equinox,” the time the sun headed from the southern to the northern hemisphere, but the Marsians celebrated both equally. They had taken to celebrating the solstices as well. Since the passage occurred at a decent hour, almost all the Outpost’s children were in the Square as well. Will’s party headed through the crowd to the Gallerie to get some ice cream. As they were going in they saw Sebastian Langlais coming out with Kristoff and Irma. “Happy equinox!” Will exclaimed.

“Thank you,” replied Sebastian. “Happy equinox! I hope you’ll have a good half annum coming up.”

“Thanks; you, too. And you’ve got a good half annum coming up, too!”

“Yes, Helmut and Clara and Charles are on their way. The *Piazzis* left Flora ten sols ago. It’ll aerobrake here in four and a half months, about the time Kristoff and Irma have twins!”

“Marvelous!” Ethel and Will said simultaneously. “Congratulations!”

“Thank you,” replied Kristoff.

“And how’s your work? You’re doing research, right?” asked Will.

“Some, but I’m basically a horticulturalist. A farmer,” replied Kristoff. He turned to Paul. “I thought you were at Uzboi.”

“Just got back. We have a six-month cycle of work here, then I’ll be going out again, probably somewhere in the southern highlands. Uzboi has made studying them more urgent.”

“Let’s get together, then,” said Irma. “And pretty soon, because the twins are getting rough to carry, and once they’re born we’re not going anywhere.”

“Next week, then,” suggested Jacaranda. “How about Tuesol?”

“Good; see you in the Gallerie,” said Kristoff.

They went inside. The ice cream line was long, but it moved quickly because it was self-service. Will diverted from the line to visit a group of Iranians, including Ruhullah Islami and Jalál and Simin Sabetian who were sitting around a table nearby. “How’s the baby?”

“Oh, fine,” replied Ruhullah. “Nadia kept her in for the evening; it’s chilly and we’d rather not expose her to cosmic radiation.”

“Not yet,” quipped Jalál. “Congratulations again, my friend.”

“Thanks,” said Ruhullah. “Of course, when Maryam’s 22 and finished with college, I’ll be 84!”

“I’m sure you’ll make it, too,” added Simin.

Will saw the attachés open on the table. “This looks like serious business.”

“We’re planning ‘Iranian night,’” replied Ruhullah. “I just got information from environmental management this sol about the availability of walnuts.”

“Walnuts?” Will was puzzled.

“We’re planning to make fessenjoon,” replied Simin. “It’s the richest, most tasty dish in Persian cuisine, but it needs huge quantities of walnuts and pomegranates.”

“They’ll be available in January,” added Ruhullah. “Happy equinox, Will!”

“You, too. See you next Thursol; remember, I’ve invited the entire Mars Residents Council for dinner.” He shook hands with everyone and got back in line in time to scoop his ice cream. He paid for the five ice creams and they headed back out to the square. They said hello to various friends. Liz spotted Corrie and waved, then hurried over when Corrie didn’t respond. “Have a happy equinox!”

“Thanks. I’ll try.”

“Are you still in a funk?”

“I guess. But my parents agreed I can go to the Muller Campus of Martech.”

“Oh. I’ll miss you, but I guess a fresh start. . . that could be good.”

“I hope so. I’m leaving Saturdaysol afternoon.”

“Okay. Keep in touch, will you?” The two friends—born the same sol—hugged, then Lizzie ran back to her parents.

The crowd was beginning to gather around the stage, where a band was playing a dance tune. A screen behind them had the countdown to equinox passing: 1:33. They finished their ice creams and prepared for the countdown.

“Ten! Nine! Eight! Seven! Six! Five! Four! Three! Two! One! Happy Equinox!” the entire crowd shouted. Then everyone began to applaud. The band struck up Auld Lang Syne and the few who knew the words sang it. But then the crowd spontaneously began to sign a more Marsian song:

*This land is your land, this land is my land,*

*From Tharsis Montes to the Hellas Basin,*

*From the cratered highlands to the Mariner valleys,*

*This land was made for you and me.*

Sept. 20, 2058: Vernal Equinox

Feb. 27, 2059: Earth/Mars opposition

Standard flight 1: Earth: Dec. 1, 2058 4.1 km/s Mars June 1 2059 3.6 km/s 183 days

Standard flight 2: Earth Jan. 1, 2059 6.8 km/s Mars July 1, 2059 2.2 km/s 181 days

Tourist flight 1: Nov. 8, 58 depart Earth, 7.4 km/s; arrive Mars 4-8-59, 150 days, 7.0 km/s; depart Mars 5/11/59, 6.8 km/s; arrive Earth 1/1/60, 9.0 km/s, 234 d (14 months round trip)

Tourist flight 2: Earth Aug. 11 2058 10 km/s to Mars 3/15/59 5 km/s; leave Mars Apr. 20 2059 8 km/sec Earth 195 days Nov. 1, 2059 (14.5 months round trip); alternative return flight: Mars 4-28-2059, 218d; Venus 12-2-59, 175d; Earth 5-25-60, 6.54 km/s 393d total

Commissioner's flight: Mars July 15, 2058 11.6 km/s to Earth 1/15/2059; leave Earth 2/10/59, 12 km/sec to Mars 8/15/2059, 186 d

Oct. 8, 2059: Autumnal Equinox

Nov. 26, 2059: Dust storm season begins

Apr. 11, 2060: Dust storm season ends

Aug. 7, 2060: Northern Vernal equinox

Apr. 2, 2061: Earth/Mars opposition

First worker flight: 12/26/60 Earth to Mars 5/31/61, 156 days, 4.4 km/s, 6.1 km/s

Second worker flight: 1/15/61 Earth to Mars 6/15/61, 4.4 km/s, 8.2 km/s

Third worker flight: 2/15/61 Earth to Mars, 7/15/61, 7.4 km/s, 2.9 km/s

Aug. 25, 2061: Northern Autumnal Equinox

Earth 2062-1-28 163d Venus 2062-7-10 155d Mars 2062-12-12 9.12  
(Mars 3.87) 318d

June 25, 2062: Northern Vernal Equinox

Started 15 August 2004; finished December 14, 2004; rewrite started Jan. 26, 2009, finished Feb. 2, 2009

July 13, 2063: Northern Autumnal Equinox

1. Ball Game 2  
Will arrives on Earth, meets Louisa Turner and the new U.S. Vice President, and gives his standard “stump speech” at Kennedy Space Center  
DATE: Jan. 7-9 2059
2. Stamford 19  
Will sees his mother and sister and visits a mall, where he has a conversation with a duck hunter.  
DATE: Jan 10-15, 2059
3. Washington 40  
Will negotiates with the Americans over a nuclear reservation on Deimos.  
DATE: 13 Jan. 2059
4. Houston 51  
Will attends a conference of land owners and visits with Rick Page, head of the Lunar Commission.  
DATE: 17 Jan. 2059
5. Beijing 73  
Will completes negotiations with the Chinese and agrees to parity with the U.S.  
DATE: 24 Jan. 2059
6. Paris 81  
Will sees his old friend David Alaoui and gets the American and Chinese deals approved by the Commission’s Board of national representatives.  
DATE: 2 Feb. 2059
7. Kourou 94  
DATE: 8 Feb. 2059
8. Outbreak 105  
DATE: late Feb. 2059
9. Tie Your Camel 126  
DATE: March 2059

10. Conflagration DATE: 7 August 2059	142
11. Arrival DATE: 15 Aug. 2059	157
12. Welcomes DATE: late August 2059	173
13. Looking to the Future DATE: late August 2059	193
14. The Prize DATE: Sept. 2059	208
15. Dawes DATE: Oct. 2059	219
16. Trials DATE: late December 2059	230
17. Crises Alexandra resists the new construction techniques; Corrie is pregnant; four Chinese meet with Will about growing alienation; Will makes a major speech about inclusiveness and launched an initiative. DATE: December 2059	248
18. Uzboi DATE: January 2060	267
19. Dedication Sam and Corrie talk in Hilo, agree to break up, and put the baby up for adoption. The site of the Bahá'í temple is dedicated and the cornerstone laid. DATE: late Feb. 2060	287
20. Equinox DATE: Aug. 2060	296

14 July 58: leave Mars  
7 Jan. 2059 (Tues): arrive Earth  
9 Jan.: Landing, Kennedy; Will gives speech calling for 600 US immigrants over 5 columbiads  
10 Jan: Connecticut  
11 Jan: Connecticut (visit mall)  
12 Jan (Sun.): Connecticut (Marshall gets sick)  
13 Jan: Washington (White House visit; Will warned to minimize Chinese involvement, he's pressured to support nuclear initiatives, he presses for gas core research on Deimos)  
14 Jan: Connecticut; evening in New York  
15 Jan: Connecticut (visit MIT and Harvard for half a day)  
16 Jan: Toronto, Ohio  
17 Jan: Houston (Mars Landowners Conference); Will discusses lunar fuel prices with company representatives  
18 Jan: Houston (Mars Landowners Conference)  
19 Jan (Sun.): Los Angeles  
20 Jan: (Travel across dateline)  
21 Jan: Australia  
22 Jan: Indonesia/Malaysia  
23 Jan: Japan  
24 Jan: Korea, Beijing; China agrees to 1,000 immigrants to Mars over 5 columbiads; China asks for caravels and moonlet hydrogen for Jupiter mission  
25 Jan: Beijing  
26 Jan (Sun.): New Delhi  
27 Jan: New Delhi  
28 Jan: Karachi/Tehran  
29 Jan: Riyadh / Haifa  
30 Jan: Tel Aviv, Ankara, Moscow; privatizing Mars Construction Institute  
31 Jan: Moscow  
1 Feb: Warsaw/Berlin  
2 Feb. (Sun.): Paris; Commission Board meeting; meets David Alaoui  
3 Feb: Spain; closes Seville facility  
4 Feb: Italy/Britain  
5 Feb.: Scotland; vacation day with family  
6 Feb: Nigeria  
7 Feb: Argentina/Brazil  
8 Feb: Kourou, launch (evening)  
10 Feb 60: Trans-Mars Injection  
15 Aug. 60: return