THE MARS FRONTIER

Vol. 16

The New Nation

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Inauguration

20 June 2066

Will Elliott stood before his bedroom mirror, adjusting his tie for a third time. Ethel noticed her husband's excessive concern. "So, are you nervous?"

"Yes. I'm nervous, terrified, humbled, and excited all at once. . . I can't even describe my feelings."

"Well, don't worry." She kissed him on the cheek. "It will be a perfect afternoon."

"I hope so. I used to being a leader, but I've never been a . . . *politician* before. Being Chief Minister of a free Mars is not the same thing as being Commissioner of the Mars Commission. I'll have to consult with others a lot more."

"Consulting with others is one of your strengths. It's probably the reason you are our first Chief Minister. So don't worry."

She looked him over, head to toe. Will was slightly shorter than average, weighed almost eighty kilos or 176 pounds, and still had a full head of hair—impressive for a 65 year old—though his originally black hair was now solidly gray. His black suit with white shirt and red tie complemented his light brown skin and was perfectly tailored for his form. He carried himself erect, but looked gentle and dignified, not stiff. "You're still an incredibly handsome man," she said. "Just as handsome as when I married you twenty-nine years ago last week."

"Thank you, dear." He leaned over and kissed her. "I'll stop adjusting my tie, then." He looked Ethel over as well. She was a year younger than he and had kept her

soft, smooth, pale complexion that had enamored him with her. “You’re stunning in that dress, and your hair is really beautiful.”

“Thank you. I spent five hundred redbacks on the hairdo this morning because I have to look right. The dress was a tricky choice because the wife of the Chief Minister shouldn’t wear something imported from Earth, but our locally made dresses tend to be unimpressive.”

“That one is quite nice. Is it by Maryam Salih?”

Ethel nodded. “Her clothes are the exception, but they’re expensive, and I don’t want to look like a rich show-off.”

“It’s perfect.” He looked at his watch. “We’d better go; the square will be full.”

“Okay.” She turned to the mirror one more time to check her makeup, then she grabbed her purse and he grabbed his attaché, which he clipped to his belt. They headed out the airlock and into the tunnel to Andalus Dome.

The alley led them to Andalus Square, the center of social and cultural life on Mars, eighty meters long east-west by sixty meters wide north-south. They entered next to the Commonwealth Building, their new Capitol; its row of stately Corinthian pillars spoke of the majesty and dignity of the government, though the building’s dome was more Moorish. It demarcated the western side of the square. The entire northern side was formed by the Gallerie, their shopping mall and restaurant center. Its Moorish façade and arched entrance helped to define the Andalusian feel of the place. The southern side of the square opposite the Gallerie was a long building filled with condos, offices, and stores at the street level; its Renaissance architecture spoke of a post-Islamic, early modern Spanish style, though its doorways retained Moorish elements. Finally, the eastern side of

the square was formed by the Aurorae Borough Hall, seat of local government, a more modern glass and steel structure with both Moorish and Renaissance elements in its façade. The Borough Hall was forty-five meters long, leaving a five-meter street access to its south and a ten-meter access to the north, and the ten-meter gap revealed a fifth building occupying a triangular lot, the Universal Church of Jesus and the Creator, a simple but dignified stone structure with a small steeple. Andalus Square summarized Mars fairly well: it was multicultural and pluralistic, but overall it was western, as Moorish Andalusia had been (though Mars was more East and Southern Asian, North and South American, and African than old Andalus ever could have been); its blended architecture reflected its mixed cultural heritages; the dominance of administrative and commercial structures reflected its heavily managed yet capitalistic social structure; and the slightly removed presence of a small Nigerian Church reflected the role of religion on Mars: present, but not dominant, for Mars had more seculars than any particular faith; diverse, with Mormons, Bahá'ís, and third world Christians as well as Catholics, Protestants, Muslims, Hindus, Buddhists, Jews, Shintoists, and indigenous religionists.

The square was covered by folding chairs. Of the 5,100 people on Mars, 2,500 lived in Aurorae Outpost, which was four times larger than the platinum-mining center at Uzboi and six times larger than the gold-mining outposts at Cassini and Dawes. Nearly six hundred people had arrived by air and surface transportation from Mars's ten other outposts and from Phobos outpost, a huge movement of people by Marsian standards. They were accommodated in Aurorae's two hotels and in the homes of a lot of friends. The United Nations flag atop the Commonwealth Building was flapping with vigor for an excellent reason; the "jet stream" of vital air circulation, which shot across the square

near the top of the dome from the Commonwealth Building's roof, was turned up to maximum strength. Underground, a network of air ducts sent huge quantities of heated and carbon-dioxide enriched air to the agricultural domes to the south and west and returned cooled, oxygenated, and purified air to the square.

The three thousand chairs were rapidly filling; large screens around the square duplicated the scene on the platform for those lacking a clear view. The dome was covered by a translucent blue-tinted sunshade to reduce the glare and minimize solar heating to keep conditions comfortable for the crowd; too bad, reflected Will, because it meant that the escarpment, a brooding wall of rock twenty kilometers to the south and 1.5 kilometers high, could not be seen. He led Ethel to the VIP seating area up front and conferred briefly with Tatiana Ivanov, who was in charge of orchestrating the entire event. In spite of various minor glitches, the event was moving forward and looked smooth on the outside in spite of the chaos within.

Will took his seat on the platform with the other forty-eight members of the Mars Legislative Council and fifty others participating in the ceremony. The Mariner Symphony Orchestra, located to their right in the southwest corner of the square, opened the program with a special musical piece composed for the occasion. Then Tatiana announced the parade of children, "symbolizing our roots on this planet as well as our heritage from Earth." Marshall Elliott, Will and Ethel's 26-year old son and the first child born on Dusty Red, led the procession carrying a large Marsian flag. He was accompanied by Sammie Anderson, 25, the second Marsian child, and Corazon Lopes, 23, the fourth child; Liz Elliott, the third child born on Mars just a few hours before Corrie, was en route to Mercury. Rich Stroger, 23, rounded out the first group. They were

followed by two 22-year olds, three 21-year olds, three 20-year olds, one 19-year old, four 18-year olds, twelve 17-year olds, nine 16-year olds, and eleven 15-year olds, their nine university students and Aurorae High School's thirty-six kids. After that the numbers multiplied rapidly; ninety first graders filled the end of the parade, wearing various ethnic costumes and waving flags of various Earth nations. It was impossible to include younger ones in the parade, who were being born at the rate of nearly one per sol. The kids marched the length of the square, then across the front of the platform, and many eyes filled with tears to see Mars's future.

One by one, Tatiana announced the representatives of Mars's religions. They arose and came to the microphone: Bishop Miller of the Catholic Diocese of Mars; Imam Aliquli Hassanzadeh of the Shi'ite Muslim community; Rev. Tuesday Nnah of the Universal Church of Jesus and the Creator; Auxiliary Board Member Ananda Thanarat of the Bahá'í community; Bishop Henry Smith of the Church of Jesus Christ of Latter Day Saints; Abbot Yoshiyaki Suzuki of the Zen Monastery; Siddharth Swaminathan of the Hindu community; Rev. Helen Gombrich of the First Presbyterian Church of Aurorae; Nathan Rubin representing the Jewish community; and Prince Bilal ibn-Majid Abbas of the Sunni Muslim community. Each briefly offered a prayer or passage from scripture about human solidarity and community. As expected, they ran over, bringing the ceremony right up to 12 noon, the time of the transfer of sovereignty.

Will Elliott rose and stepped forward, accompanied by Colonel Brian Stark representing the United States, General Zhou Qisheng representing China, and twenty-two Marsian citizens who had been appointed to represent their terrestrial nations on a free Mars. The twenty-five of them crowded the platform.

"I stand before you at 11:59 a.m. as Commissioner of the Mars Commission," began Will. "The Commission is a consortium of twenty-six nations, twenty-four of which are represented here this sol. For twenty-five years, the Mars Commission has been the international body in charge of this world. In that time, the human population of this planet has increased three hundred fold. The Commission launched Mars on a path leading to a glorious future and has outlived its usefulness. It now passes the torch of sovereignty and self-determination to the freely elected government of the Marsian people."

Colonel Stark and General Zhou, the commanders of the American and Chinese governments' nuclear facilities, stepped over to a flagpole on the side of the platform where a United Nations flag flew. While the orchestra played "Ode to Joy" the two men lowered the flag. Simultaneously, the U.N. flag flying over the Capitol was lowered as well. Stark and Zhou removed the flag, folded it carefully, and handed it to Elliott.

Then Will Elliott and Emily Scoville-Rahmani, clerk of the Legislative Council, walked to the flagpole with a Marsian flag, which they slowly raised while the orchestra played "Red Mars Our Home," the informal national anthem of Mars, which used the same tune as "God Save the Queen" and the song Americans called "My Country 'Tis of Thee." The audience stood and sang along as the flag rose over the platform and over the Capitol building simultaneously:

This world is our land
Vast craters, ruddy sands
Red Mars our home
Justice and equity
Freedom, prosperity
Unity in diversity
Red Mars our home

They cheered and applauded riotously when it reached the top. Will cheered as well; the excitement was contagious. “What a sol!” he exclaimed to Emily.

“Did you ever think you’d live to see it?” she asked.

“I thought maybe when I’m one hundred! But no, I was wrong. Here we are, an independent nation!” He wiped a tear from one cheek.

“It’s a special moment because we love our world!” she exclaimed, stumbling over inadequate words because she felt unable to express her emotion.

The orchestra began to play the Marsian verses to Arlo Guthrie’s “This Land is Your Land” and everyone, including Stark and Zhou, sang it as well, all seven of the unofficial stanzas that different people had invented at different times:

This land is your land, this land is my land,
From the Hellas Basin, to the cratered highland,
From Tharsis Montes to the Mariner valleys,
This land was made for you and me.

As we were ranging across his deserts
Along his channels, o’er gleaming ice caps,
We fell in love with his ruddy vistas
This land was made for you and me

As we were walking along the cliff edge
We saw above us, the twin moons shining
We saw below us the Aurorae Valley
This land was made for you and me

We were prospecting Dawes to Cassini
Dug golden riches in Meridiani
Found nuggets plenty in Thymiamata
This land was made for you and me

As I was flying toward Phobos beaming
To build ships valiant, fill sailers gleaming
I glimpsed a red globe, my cratered homeworld
This land was made for you and me

We've flown from terra to the dusty red ball
To build a country with justice for all
To found a new home, a city of the free
This land was made for you and me

Marsians are moving, Marsians are talking
Calling for justice, voting for freedom
And all around us the feeling's growing
This land was made for you and me.

Then they applauded yet again.

Tatiana ordered two young men to carry onto the stage a table with a captain's bell and a leather captain's logbook already on it. That was the cue for Will, Emily, and the national representatives crowding the platform to sit down. "Ladies and Gentlemen, allow me to introduce Chief Justice Silvio DiPonte of the Mars Supreme Court," Emily exclaimed in an attempt to restore some order. Silvio rose and walked to the table. The crowd began to sit and quiet down.

Silvio waited for the crowd. Once they were quiet he announced, "Mars is now an independent nation." That brought everyone to their feet again, cheering and applauding. He clapped a bit, then smiled and added, "But until I can swear in the Chief Minister, we are leaderless! So let us proceed with the ceremony." He picked up a small metal rod and rang the bell eight times in four pairs of beats; ring ring; ring ring; ring ring; ring ring. The sound emanated from the loudspeakers and resonated across the square. "This captain's bell was brought to Mars on Columbus One in 2036 by Commander Laura Stillwell and has been rung to mark all our public milestones, including inaugurations. She also brought this captain's logbook, which is the principal property and symbol of

the office of chief executive officer of Mars. Will former Chief Minister Alexandra Lescov and Chief Minister elect William Stephen Elliott please come forward."

Will and Alexandra rose from their seats. Will stood to Silvio's right; Alexandra stood to Will's right and placed her hand on his shoulder, as if she were laying hands on him to transfer her authority. "Will Elliott, please raise your right hand and repeat after me." Will raised his right hand and placed his left hand on the Captain's Log. "I, William Stephen Elliott, do assume the responsibilities and privileges of the position of Chief Minister of the Commonwealth of Mars. I pledge to defend and uphold the Constitution of Mars and serve the people of this world."

Will took a deep breath. "I, William Stephen Elliott, do assume the responsibilities and privileges of the position of Chief Minister of the Commonwealth of Mars. I pledge to defend and uphold the Constitution of Mars and serve the people of this world."

"Congratulations." Silvio extended his hand and they shook; the public roared its approval. Will picked up the Captain's Log, an object he hadn't held for almost ten years, and raised it high before the crowd while they applauded. Silvio and Alexandra retreated to their chairs, leaving Will Elliott alone before the people of his new nation.

He carried the Captain's Log to the lectern nearby and turned to the telepromper, which remained blank. No doubt Tatiana, off stage, was frantic. He waited a moment, surveying the crowd, trying to look confident and benevolent when he was actually feeling a rush of emergency adrenaline. But when it remained blank he decided he had better start without it. He was giving his inaugural address as a story; he didn't need the speech. "Chief Justice Diponte, Justices of the Supreme Court of Mars, Former Chief Minister Lescov, Fellow Legislators, Ambassadors Zhou and Stark, Ladies and Gentlemen, my fellow

residents and now citizens of Mars: As I stand before you this sol, I am compelled to think back to a sol like this one thirty years and four months ago when two astronauts on Columbus One named Elliott and MacGregor walked through the notch between Boat Rock and Layercake Mesa and looked out over a rolling, rocky plain that stretched to the escarpment and included this very spot. They did not see, not could they have imagined, the dome, the buildings, and the huge crowd now filling this place. They were surveying the land to reconsider the proposed location of a small two-habitat outpost, and they settled on a spot a few hundred meters east of here at the base of Face Rock, which seemed particularly auspicious and attractive.

"Two ships bearing six crew had just landed in the Aurorae Valley. They represented five nations. Because they were selected based on seniority and various political factors, they did not easily form a community. They weren't here to establish a community, but to explore Mars, characterize its geology and its biological past, study its magnetic field and climate, and found a small outpost that might conceivably evolve into something larger in the future. After all, Columbus 1 through 5 were aimed at science, they were to establish a permanent presence of no more than twelve persons, and there were no official plans to follow them with further missions.

"But the social dimension of the mission could not be ignored or denied. The Columbus 1 crew soon found that they had to create a community in order to survive and be happy. Some of them found love on Mars: love of each other and love of the land itself. So some of them asked to stay even though it was not in the mission plan.

"More people arrived. Children were born, community had to be built, and the new hamlet faced challenges that they could only solve through democratic governance and the rule of law. It began to dawn on them that Mars represented a new start for humanity.

"Of course, in the first six years there was still no prospect for significant growth in numbers. But then a technological revolution, long sought and expected but too long delayed, occurred: the cost of reaching low Earth orbit dropped to a fifth of what it had been, with a reliable prediction that it would halve again in a decade. Suddenly, budgets designed to send eight people to Mars could send forty. Economies of scale and further price declines meant that one hundred were able to go, a decade later. That triggered economies of scale on Mars and gave it the human resources to export and earn income. In two decades, growth to a thousand went from a distant dream to a reality.

"The business of creating a new civilization became a reality that was achieved self-consciously. Some of the greatest cultural debates in human history occurred in Yalta's cafeteria and in the Gallerie. Few nations had ever emerged before that had not thrown off shackles through violence: either the shackles of tyranny or of foreign rule. The violent beginnings of many nations echoed throughout their history and reinforced a distrust of or cynicism toward government. But tyranny was not to be in Mars's future, and everyone knew it. Oppressive external rule seemed highly unlikely. A nation conceived in justice, equity, freedom, prosperity, and unity in diversity: this was not new, but the optimism that it was possible was new, as were the peaceful conditions for their achievement. Optimism bred confidence. Cultural and religious diversity brought new ideas to the table and a new synthesis began to emerge. Growth fueled and deepened the synthesis.

"A new civilization took shape, neither eastern nor western, neither Christian nor Muslim, Hindu nor Buddhist, Confucian nor secular, a civilization that sought to elect leaders based on their character and not their ideological platform, that aimed for a little financial struggle but no poverty and some riches but no extreme wealth. The civilization needed judges, constables, and laws, but not many of them; it supported persons in their existential struggles so that they avoided alcoholism and suicide and minimized the pain of divorce. The new society aimed to blend the emphasis on justice of the British, the focus on civilization of the French, the striving for personal freedom of the Americans, the discipline of the Germans, the love of family of the Latin Americans, the search for harmony of the Hindus, the appreciation of filial piety and respect of the Chinese, the hospitality of the Muslims, the love of life of the Africans, the detachment of the Buddhists, the appreciation for education of the Jews, the quest for unity of the Bahá'ís, and many other values, usually found in all cultures and religions in various degrees, yet expressed in a new way on Mars. The synthesis resonated with millions on Earth and became a beacon of hope for humanity's future. The vibrations and sometimes shock waves Mars has set up in terrestrial cultures are only just beginning to wield an influence on humanity's destiny.

"Here on Mars, tests have forged a consensus on many of our values. Sometimes the result has been unexpected. In the last few years a gentle but tumultuous adolescence has shaken our nation and set it on the path of young adulthood. Today marks the beginning of our maturity as a nation and civilization; this ceremony is our coming of age. But while it represents the end of one phase in our national life, it marks the beginning of a much richer, longer, and more glorious stage, a stage whose efflorescence into something else—yet another age—can only be dimly traced and speculated about.

"The principles outlining the new era on which we now embark, at least, are clear. Growth must be our highest priority. We cannot expect another revolution in transportation costs; doubling our population every three years, as has been our historic pattern for the last thirty years, will not continue; but we have a world to fill, a planet of resources to develop, and no discernable limits on growth for more than a century. This is in sharp contrast to most terrestrial nations, which can not afford doublings of population. This fact alone has profound consequences for us. We will be a young society with a high percentage of children and low costs for health and retirement, and we will be a selectively recruited society with low costs for drug treatment, alcoholism, and attendant social ills. These social facts alone mean we will have unemployment and poverty problems an order of magnitude less than terrestrial societies, and can focus our expenditures on mental wellness and human fulfillment as well as on science, technology, and exploration. Mars already devotes as much money to space exploration as some technologically advanced societies with tens of millions of citizens.

"But physical expansion of our society by itself is not sufficient, for it cannot protect us from financial corruption, political intrigue, substance abuse, the erosion of social ties, and the weakening of familial bonds. Indeed, growth can seduce us into thinking that developing the material side of life is all we need for happiness. Instead, our debate on values must continue and our culture must express an ever-stronger and deeper consensus about the values that lead to true happiness. The quest for justice must remain uppermost in our minds and hearts, for without justice there is no peace or happiness. Justice implies equity for all citizens, and we have not freed ourselves from prejudices, biases, and discrimination. Justice implies access to the resources necessary for life and freedom from

want; we must remain on guard that a common prosperity remains a constant goal and poverty is kept at bay. Finally, the ultimate goal of Mars must be unity in diversity. Unity in diversity is founded on justice, equity, and freedom from want; they are its prerequisites. It balances the freedom of the individual with the needs of society. It respects all peoples and encourages legitimate differences, but recognizes our need to express our common humanity together, in society, and creates the foundation for us to work together for the good of all. It strengthens our love for each other and sets the conditions to express that love wisely and effectively.

"These principles, then, define my administration. First: physical growth, not only in terms of numbers but in terms of material development, comfort, and prosperity. Second: a deepening of our understanding and commitment to the principles of justice, equity, freedom, prosperity, and unity in diversity. The first commits resources to building things: galleons, domes, reactors, factories. The second commits resources to the arts, to the design of common spaces such as squares and parks, to the fostering of dialogue through scholarship, film, and the media, and to other expressions of values. But the commitment to learn about and express these values ultimately falls on us as individuals, families, and groups of people. I pledge myself to an effort, in the next two annums, to work with you so that we can grow together as a community, deepen the bonds that unite us, move Mars toward its great future, and help Mars contribute to humanity's ultimate destiny. Thank you."

2.

Concord

20 June 2066

Mike Tobin and Liz Elliott watched the independence ceremony on the wall screen in their suite. The image was occasionally punctuated by interplanetary static. Will's speech had been followed by applause and handshakes. Mike looked at his wristwatch.

"We've got to turn this off and get to the ferry. Once we're on board we can send your dad a congratulatory email. It was the best speech I've heard him make."

"It was good," agreed Liz. "So unexpected: he retires from running Mars for twenty-six years and gets elected to do the same all over again, wearing a different hat!"

"He has run Mars wearing quite a few hats," agreed Mike. "Each time it requires a different set of skills. I don't know how he does it."

"He's got a lot to do this time; appoint a cabinet from scratch, an ambassador to Earth, appoint six more members to the Supreme Court, help find a new Director of the Saturn Commission, and set up a government for the first time."

"The 'first time' part is the challenge. Well, we have our own first time. Let's go."

Liz nodded. Mike grabbed two very large suitcases, leaving Liz to struggle with the third one. They looked around their two-room suite quickly to make sure they hadn't left anything, and reflect about five months of living in the space. Then they stepped out and closed the door behind them.

The caravel *Pollux* looked deserted as they walked its corridors for the last time and took elevator 3 to the hub. It was a spinning plate thirty meters in diameter, shaped like a discus except it was fattest in the middle—closer in shape to a squished capsule than a pizza—linked at the hub to a non-spinning exterior skin on which solar panels, antennas, fuel tanks, and other necessities were located. The *Pollux* was capable of carrying 150 people on a six- to nine-month journey through interplanetary space. Accompanying it on its voyage from Mars to Mercury and then on to Earth were five other caravels. The fleet had a total crew of twelve, plus six passengers bound for Mercury and ten tourists returning to Earth; it was about to pick up fifteen passengers from Mercury bound for Earth. Everyone would rattle around in a huge amount of living space. The ships, however, would fill up in Earth orbit and return to Mars in another year.

The elevator stopped at the hub and the door opened. Mike clipped the suitcases to the right and left sides of his belt and they slowly floated out. He moved carefully in the near-weightless conditions. There were two persons ahead of them. Commander Tamara Holmes of the caravel fleet was floating by the door to wish everyone the best. She extended her hand to Mike. “Have a great time on Mercury and come back to Dusty Red, okay?” she exclaimed in her New Zealand accent.

“That’s the plan, don’t worry,” he replied. “Thanks for a good voyage.”

Holmes nodded and extended her hand to Liz. “Show ‘em how to dance.”

“Thanks,” replied Liz with a smile. “See you again, I suspect.”

“I hope so. Godspeed.”

Mike turned and pushed himself through the docking hatch into the ferry with Liz right behind. The ferry consisted of an old interplanetary transit vehicle, a sort of big,

elongated capsule six meters in diameter and thirteen meters long. It had five stories, each with a progressively larger diameter. They floated past the top-most level, a small room for spacesuit donning and storage of EVA equipment. The next level was a galley with lockers for food storage. The third level down, 4.5 meters in diameter, had four acceleration couches and a small cockpit; it was their ultimate destination. But first they continued down to the fifth and bottommost level to their tiny stateroom and stowed their luggage. They returned to the third level and strapped in.

Soon all six of them were strapped in, including the captain, Robert Arajarvi, and his copilot, who closed the tunnel to the *Pollux* and removed the docking apparatus. Arajarvi commenced the undocking sequence and soon a series of clanks could be heard as they disconnected from the caravel. A series of sharp bangs followed as the reaction control jets moved them away from the caravel and toward the pair of SCN-30 nuclear engines and their hydrogen tanks floating in the caravel's shadow half a kilometer away. The distance minimized the radiation that the engines sent toward the *Pollux* but kept the supercold hydrogen away from the sun's roasting light.

It took two hours to cross the void and dock to the far end of the propulsion stack, with the hydrogen tanks shielding them from the engine's neutrons. The pair of engines had been checked out by Arajarvi and the caravel crew repeatedly over the last two weeks; two provided redundancy in case one had to be shut down. Small chemical propulsion engines pushed the now-assembled ferry away from the caravel so that its engines could be fired safely.

They floated weightless twelve hours, spending most of the time asleep except for the ever-alert Arajarvi. Meanwhile, Mercury grew larger and larger outside the portholes.

Mike was fascinated to note how much it resembled the moon; Liz was surprised by its slightly ruddy, almost Mars-like hue. Soon they could see it growing in size second-by-second as they accelerated in their approach, its brilliantly lit sunward side too bright to look at unprotected.

When they were five thousand kilometers from the surface the two nukes began to fire. The thrust quickly built up to one earth gee. Everyone sat patiently or said a prayer; at least one engine had to work or they would die slowly in space. For fourteen minutes the SCN-30s fired, then the thrust slowly faded as the engines were shut down on schedule and their extra heat was dissipated through low-level thrust. “Come on, Robert,” and “How was it, Robert?” the passengers began to ask and he nodded as if to say “good” while glancing at the telemetry, talking to Commander Holmes, and completing the separation of the nuclear engines from the interplanetary transit vehicle, which would complete the trip a few kilometers from them to minimize radiation. Finally, the SCNs were away and he was sure. “The burn was perfect; delta-v, 10,484 meters per second, which is just five meters per second too high. That’s the preliminary data from the Mercury GPS system; in half an hour we’ll have a refined estimate. We’ll reach Portage Station in twenty-six hours. So everyone head to your rooms, unless you want to hang out here. Someone please heat me up a tube of soup.”

Mike looked at Liz. “Let’s go.”

“Okay,” she said, and they headed down the central shaft of the ITV toward their room, where they released their bent up nervousness about the burn and their curiosity about weightlessness by making love.

Portal Station was nothing exciting or interesting: three ITVs connected to a docking cylinder, two Hermes shuttles with full fuel tanks, a tanker farm containing hydrogen and oxygen propellant a kilometer away, and a spare pair of solid core nuclear thermal rockets several kilometers away. It rested at the sun-Mercury lagrange 2 point, the point where the two bodies' gravitational fields canceled each other out, a hundred thousand kilometers beyond Mercury. The tanker farm remained permanently within Mercury's shadow, cryogenically cold; the nukes lurked beyond them to keep the ITVs in the tanker farm's radiation shadow; the ITVs floated in Mercury's penumbra where their solar panels received some light but their systems could handle the thermal load. The ferry approached at about 1,000 kilometers per hour and fired its on-board chemical engines to slow to a near-stop. Two hours later they docked to Portal, which had a temporary two-woman crew who had sent a ferry on its way to catch up with the caravels two days earlier. They remained long enough to shut down the ITV's systems and transfer to the Hermes shuttle.

Another twenty-four hours of weightlessness passed as the Hermes shuttle *Suisei* glided back toward Mercury, bound for Concord Station near the north pole. The last five minutes of the trip, the shuttle's five engines came on with great force; the passenger cabin's television screen showed a horizontally-lit Mercury looming up with great speed. As the engines throttled back, the shuttle experienced a slight bump. They were down.

Captain Teresa Soares activated the loudspeaker. "Welcome to Mercury. Engine shut-down will require about ten minutes, at which point a Conestoga will dock and drive all of you to Concord. We're delighted to get our first Marsian crew here safely and look forward to an active connection with Dusty Red. Please stay!"

The seatbelts sign went out at the same time, so Mike and Liz rose from their chairs and stretched. “The gravity feels familiar!” said Mike.

“Yes.” Liz rose on her toes and bounced a bit. “It’s a bit less than Mars; I can feel it.”

“Can you really?” asked Dr. Pierre Benet, who was seated behind them.

“Yes, it’s noticeable to my ballet reflexes.”

He looked impressed, but skeptical. His wife Brenda was more sympathetic to her claim. Liz turned and followed Mike to the luggage locker, where they retrieved their three big suitcases. By the time the six of them had their luggage, they could hear clanks as the Conestoga began to dock to the shuttle’s airlock. Heavy metal latches slipped into place and locked a docking tunnel against the ship, which then began to fill with air.

A few minutes later the airlock opened and Commander Olaf Norlander stepped into the ship. He was 55 years old, short, with graying blond hair and intensely blue eyes; even more intense than Mike’s, Liz thought. She immediately recognized him from a brief meeting at Shackleton Station three years earlier. He surveyed the room and opened his arms. “Welcome to Mercury!” he exclaimed. “I can’t tell you how delighted we are to have our first reinforcements from Mars. The first of a flood of people, we hope.” He extended his hand to Pierre. “Dr. Benet, we’re delighted you’ve come, even for two months, to assist with the fertility work here. We have several couples wanting to start families.”

“Thank you; I’m here to do some eye surgery as well. I’m sorry I can’t stay two years, but it sounds like two months will be enough.”

“I think so. The two caravels flying to Mars in August will bring us fifty new people and will pick up twenty bound for Mars.” He turned to Pierre’s wife. “Dr. Brenda Benet, we’re looking forward to your ideas for automating our mining processes.”

“I’m excited by the opportunity, thank you.”

“Mike Tobin, are you sure two years will be enough for your research? We’d love to have you and Liz settle.”

“We’ll see, Commander.” Mike laughed a bit and shook Norlander’s hand. Olaf reached to Liz. “You’re going to do so many things for us, I can’t count them all! But bringing us dance; that will be thrilling. We don’t have enough arts here.”

“I’ll do my best.”

They shook as well, then Olaf turned to the remaining two passengers. “Krishna Meena, you are only the second Indian to come to Mercury. Your expertise on solar panels and power storage systems is most welcome and badly needed.”

“Thank you, Commander. Caloris presents some fascinating challenges.”

Olaf extended his hand to the last passenger. “Gerhard Frick, welcome to Mercury. We welcome your ore science expertise.”

“Thank you.”

Norlander theatrically gestured to the airlock and led them into the Conestoga. He helped settle the luggage and introduced everyone to the driver, Gabor Horvath. Then they closed the tunnel, depressurized it, and separated from the shuttle. The conestoga turned and headed for the station.

“We’ll give you the Cook’s Tour,” said Olaf from up front. “Right now we’re passing Leman Crater; as you may know, we’ve named craters in this area for terrestrial

lakes because they all have ice on their floors. Leman is an exception: it's relatively young, fresh, and deep, so its floor is almost ice free. But because it's deep and sunfree, Leman is our cryogenic storage facility. We'll stop on top so you can look in."

They all craned their necks to see out the front windshield. The conestoga topped the rim and began to descend into the blackness, its headlights providing the only illumination. They stopped and they couldn't see anything in front of them outside the headlights until Gabor turned on a searchlight on the roof and panned around the crater, casting pools of light on hydrogen, oxygen, methane, and nitrogen tanks. Then the conestoga did a U-turn and went back out of the crater.

The dirt track took it across a rolling, fairly flat plateau toward a crater rim, then it turned and ran along the rim. Sometimes they caught glimpses of an inky blackness to their right. "Ahead is the road down to the floor of Elysium, a mature crater twelve kilometers across and 500 meters deep. Sun penetrates to the center of the crater floor for a few dozen hours every Mercurian day—which lasts 110 days, remember—but otherwise the crater is in perpetual darkness. We'll stop and once your eyes adjust, you'll see the ice deposit."

The sun was shining more or less from behind them, so when the road went up a slight incline the road in front of them was quite bright, and if the road went down a slope it was in blackness. One such slope was quite long, leaving the conestoga in darkness for twenty seconds or so. Just as the conestoga was about to pull out of the shadow, Gabor stopped the vehicle so they could see. At first there was just blackness, but as their eyes adjusted a huge snowfield appeared. "Wow!" said Mike.

“The rim on the other side is pretty bright,” added Olaf. “This floor gets about as much light as a winter field at night under a full moon on Earth.”

“How thick is the ice?” asked Liz.

“This isn’t a little frost mixed into reg, like at Shackleton. There are places the ice cap is thirty meters thick.”

“Thirty meters!” exclaimed Liz. “That’s amazing.”

“It’s only 3.4 billion years of accumulation,” noted Olaf. “Something happened 3.4 billion years ago to tilt Mercury’s axis temporarily and drive most of the volatiles from Elysium crater, probably a meteor impact that temporarily precessed the spin axis.”

“And what’s the sulfur content of the ice?” asked Frick.

“About 1.6 percent. The hydrogen sulfide and sulfur oxides were released by volcanic activity. The ice is also about a tenth percent ammonia and nine tenths of a percent carbon dioxide. We can produce all the volatiles we need.” Olaf nodded at Gabor and they began to move forward again.

The road took them up and down gentle slopes for five kilometers until they began to approach Concord itself. They could see a metal frame on a low rise about one hundred meters from a large, round dome; a third dome rose behind the second. “Here we are: Concord Station,” said Olaf. “Straight ahead of us is our original B-60, the one that depressurized six years ago. The damage has been repaired and the vegetation is lush again. Behind it is our second B-60 that was finished four years ago. The excavation to the left is for a new B-75 that arrived from Mars via solar sailer just two months ago. We hope to get it set up and inflated in the next month. With our expansion to one hundred crew, we need the space.”

“Are they enough to feed one hundred?” asked Krishna, surprised.

“Yes, together the three are. The domes have near-continuous sunlight inside, so plants grow faster. We also import food, mostly from Mars.”

“I see the dome has a roof over it,” said Liz. “Is that for micrometeoroid protection?”

“Yes, before we inflate a dome we build a framework to support a flat roof above it. The roof is a nickel-steel frame supporting nickel-steel tanks filled with two meters of water, with a thin layer of reg on top of them to stop micrometeoroids. Radiator fins stick up through the reg to radiate heat into space; the water reservoir is our main heat sink. We get a lot of radiation here at the poles, thanks to Mercury’s magnetic field, but the water stops all of it. Beneath the roof is ‘the palisade,’ a series of pivotable vertical louvers that circle the dome. By rotating the louvers we can reflect sunlight inside.”

Liz nodded, wondering how she would react to the interior. She had been initially impressed by Shackleton, but had soon felt enclosed; this was a smaller version of the same. But Mike wasn’t worried about claustrophobia. “That’s a lot of water!” he said.

Olaf nodded. “But we have a pipeline from the crater floor.”

They drove past a line of additional radiators. The conestoga approached a garage airlock and drove inside; the outer door closed and air flooded in. Then Gabor opened the airlock’s inner door and drove inside. They had arrived. “Here we are,” said Olaf. “Your buddies should be waiting. Remember the welcoming dinner tonight.”

They all rose and began to grab their luggage. The two doors opened and Mike stepped out, followed by Liz. Dr. Christina Andropoulos was waiting for them and

waved. “Mike!” she exclaimed. He saw her and walked over. “Welcome, welcome. It’s so good to see both of you.” She shook hands. “I hope you had a good trip.”

“Pretty good,” replied Mike. “Luxurious, in terms of personal space.”

“I guess so; twenty-eight people in six ships able to transport a thousand! We’re delighted. We hope we can eventually get a caravel to stop for three months with tourists and temporary workers, then continue on to Earth or Mars. And we look forward to more expertise from Mars, you all are way ahead of us in many areas.”

“We look forward to the exchanges, too,” agreed Liz.

Christina grabbed one of the two suitcases from Mike. “Let me take that one. This way. We’ll walk across the dome.” She led them to a corridor. “I wanted to come with the conestoga to greet you, but Olaf said no.”

“It would have been pretty crowded.”

Christina shook her head. “No, Gabor was Krishna’s buddy and Olaf plans to show the Benets around. I’ve been in conestogas with fifteen people wearing suits; that was crowded!” She paused. “He’s just trying to keep me in my place.”

That surprised Liz. Christina opened a door and suddenly they entered the dome. They were hit in the face by warm, moist air, bright light, and lushness; there were plants everywhere. The sixty-meter circular space had no buildings in it but the perimeter was punctuated by windows; climbing vegetable plants covered the walls. A grove of tropical trees, mostly citrus, filled a quarter of the space, and half the floor was rice paddy. They started on a sidewalk. Liz looked up at the ceiling above the dome, which sparkled like shiny aluminum-foil. She tried to imagine it as stars. She looked around at the “palisade”

of louvers that circled the dome, but she couldn't tell which way the sun was coming in. "Where's the sun?" she asked.

Christina stopped and looked around closely, then pointed. "Most of the sunlight seems to be coming from ahead of us, which means the sun is entering the dome from behind us and bouncing off the louvers in front of us. It's hard to tell. Bright, diffused sunlight is the best for agriculture; there are no shadows. It's actually about fifty percent brighter in here than on the earth's surface at noon. That plus twenty hours of sunlight per day means we can raise food on half the land you need to use on Mars."

"Not twenty-four hours?" asked Mike.

Christina shook her head. "Plants need rest, too, even genetically modified ones."

They crossed the dome and entered a doorway on the far side. "This is 'HQ,'" Christina explained as they entered a hall full of tables and chairs, twenty meters long and ten meters wide, with a curved ceiling five meters high. "This cylinder has the cafeteria, with the kitchen and storage underneath. The next cylinder has the store, barber shop, and Concord Control. The third cylinder has the clinic on the main level and housing for four people on the lower level."

"Is this the one that deflated?" asked Mike.

"No. Paralleling this line of three cylinders are two other lines of three cylinders; Alpha Dome has nine cylinders on this side and four on the other side. Altogether they house and provide work space for seventy people. The line to the right of us is called East and the line to the left is called West. It was East number 1 that deflated. But it was a lot scarier than that suggests! For a while we were afraid we'd lose East number 2 as well. And South number 1—the one next to the garage on the other side—leaked as well."

“That would be frightening,” agreed Liz. “We’ve had various minor leaks at Aurorae. They can affect morale seriously and make it hard to sleep at night.”

“Exactly. The depressurization of Alpha was a huge blow. We still haven’t recovered from it.”

Christina led them through an airtight hatch into a small room with three other hatches; the one straight ahead led to Central number 2, whereas the hatches to the right and left led to East and West. They passed through the next cylinder and Liz glanced at the store as they went. They passed through the third cylinder and continued straight into Beta Dome’s Central number 3. “Beta has two lines of three cylinders each, so it can house and provide work space for thirty. Your flat is in West number 1.” They walked down the corridor, passing doors labeled “C3A” and “C3B.” A spiral staircase led to the lower level and flats C3Z and C3Y. Another pair of hatches led them into Central 2. After passing through they took a side corridor to Beta’s West number 1, which had West 2D.

“Mike Tobin. Open,” said Mike, and the door unlatched.

“Good, they programmed it,” said Christina. Mike pulled the door open and they entered a living room four meters wide and five meters long, with a kitchen sink, refrigerator, and microwave built into the wall next to the bathroom. The room was simply furnished with a gray couch and two gray easy chairs resting on a light gray wall-to-wall carpet. The wall opposite the kitchenette had a screen that covered its entire four meter width and two meter height A short two-meter corridor—with a door to the left leading to the bathroom and a door to the right opening into a big storage closet—led to a four by five meter bedroom. It had a double bed, an armoire, two bureaus, and a chair.

“Simple and basic,” noted Liz.

“That’s all we have up here. The store has some accessories; nice pictures you can get printed and framed, couch and chair covers in various colors, etc. The used ones are cheaper, but everything here’s pretty expensive.”

“I heard,” said Liz. “What about the color of the walls?”

Christina looked at them; they were an off white. “What about them? This is the standard color. Maybe construction can give you a few other colors.”

“We can set the color of the wall screen,” said Mike.

Christina looked around. “It’s just 11 a.m. now. I’ll be glad to hang around with you, but maybe you want some time to rest and unpack; three days of weightlessness and changing vehicles three times can be tiring. You’ll find linens for the bed in the closet; I checked yesterday. I bought you some coffee and tea and some breakfast cereal and cookies; they’re in the cabinets next to the kitchen sink. If you want me, call or stop by my office. Geology is in Alpha’s West 2 and 3, and my office is West 3A.”

“I see my office is West 2V. That’s the lower level?” asked Mike.

Christina nodded. “You got it. Liz, the arts are assigned to South 1B; it’s a big, largely empty space. Day care and the school are in Alpha East 2. If I remember right, you are also assigned to horticulture, which is South 2.”

“Horticulture?” asked Liz.

“Yes. All of us have tasks in horticulture or construction; that’s been true since the depressurization four years ago. We’ve been doing double duty and it has exhausted us. That’s one reason the flight that just left for Earth had fifteen on board and the flight to Mars in August will see twenty more depart. It’s been really hard.”

“How much longer will the extra duties last?” asked Liz.

“Olaf says three or four more months, but he’s been saying that for over a year. Gamma Dome—the big B-75 under construction—will take at least six months to set up. Mike, you have certification for construction, so you have construction work; probably twenty hours a week.”

“Really?”

“Yes. I’m surprised they didn’t send you your schedule for the rest of June and July. I suppose June will be training anyway, and the July schedule will be distributed June 25. Anyway, I’ll leave the two of you to get settled. Call me. I’ll be eating lunch about 12:45, and of course I’ll see you at the welcoming dinner at 6.”

“Thanks, Christina,” said Mike. He offered his hand and they shook. “Looking forward to working with you.”

“We’re looking forward to having you on the team, too.” Christina nodded to Liz, then headed for the door. She closed it behind her.

Liz looked at Mike. “This is going to be interesting.”

“Yeah. Right.” Mike reached over and tapped the wall. “Some sort of nickel-steel, probably with a heavy plastic ‘wallpaper’ covering.”

“It’s not the sheetrock construction we know.”

“Nope. They’ll have to give me a lot of training if they want me to do construction! I don’t mind doing some construction, but they should have warned us!”

“I get the impression this place is not as well organized as Mars.”

“Incompetence would be one explanation.” He shook his head. “Bad management culture.”

“It sounds like the depressurization shifted everyone into emergency mode and they got sloppy.” She looked around. “This is a bit smaller than a Martian flat, and not as nice.”

“No. Well, let’s get unpacked. We’re staying two years.”

“I get the armoire! You can use space in the closet.”

Mike rolled his eyes. “Figures.”

They put the suitcases on the bed, opened them, and began to unpack. It didn’t take long; their personal allowance had been forty kilos each, not much mass for two years. They made the bed, unpacked linens, washed—they hadn’t had a shower in three days—and inaugurated their new flat properly by making love. By then it was after lunchtime, so they ate the breakfast cereal and cookies and took a nap. It was after 4 when they woke up.

“God, if we don’t get up, we’ll be confused about the time for days!” said Mike, bounding from bed.

“The sunlight certainly won’t give our bodies any hints,” agreed Liz.

They quickly dressed and went out to explore. They walked the last ten meters to Beta Dome; like Alpha, it was completely agricultural except for a few sidewalks and two tiny areas of grass. A quarter of the dome was a grove of temperate-climate trees; the rest had fields of wheat, corn, sorghum, and potatoes, with beans, squash, cucumbers, and peas climbing the walls. A big patch of strawberries occupied a strip at the edge of the grove.

From there they walked the length of the eastern cylinders, 180 meters to Alpha Dome, mostly looking at the doors of flats. They crossed Alpha and explored the two

north and the two south cylinders; except for the empty room devoted to the arts, the others were dedicated to manufacturing and construction.

They walked back to HQ and explored the store. Liz sighed when she saw the limited range of choices, made sharper by the fact that most of the items were Marsian made. She had to convert the prices from euros to redbacks and was unsettled to realize they cost about two thousand redbacks per kilogram, twice as much as terrestrial imports on Mars.

Krishna walked in with Pierre and Brenda. They were all looking glum. “So have you been assigned to the kitchen?” asked Krishna.

“No,” replied Liz. “I’ll be doing some horticulture.”

“At least I get to fix robots,” said Brenda. “They have a lot of broken ones and have had no time to repair them.”

“I won’t be going to Caloris for three months,” said Krishna. “They don’t fly between the outposts and you can only drive it at night. So I’ll be working on the heat transfer system for Gamma.”

“That’s important,” said Mike. “I’ll be doing construction, and I don’t know the techniques they use.”

“Be careful; pressure suits are different here,” said Pierre. “I’ll be doing some horticulture as well. I guess that’s alright; only six couples are trying to get pregnant.”

“But you expected to be giving medical seminars to the other medical personnel,” reminded Brenda.

“I’ll squeeze them in.”

"And I'll be sure to squeeze in my research," agreed Mike. "They're really stretched here."

"That's the excuse," commented Pierre. "And after four years it's wearing thin."

3.

New Responsibilities

25 June 2051

Will surveyed his new office on the top floor of the Commonwealth Building. When Érico Lopes had been Chief Minister he had set up the room quite tastefully. The tops of its white walls and its ceiling were decorated with plaster designs—of plastic, not real plaster, of course. The room was dominated by a heavy wooden desk imported from Earth set close to the back (north-facing) wall. Some very attractive imported antique chairs that were surprisingly comfortable circled a mahogany meeting table in a corner not far from the door in the southern wall. The office also had a balcony overlooking Andalus Square to the east, with floor-to-ceiling windows that opened. The balcony contained a small table with a glass top on a metal frame with three informal cloth chairs around it, so he could entertain guests outside if he wanted to. Alexandra had kept everything except a video screen covering part of the north wall behind desk; she replaced it with the latest three-d technology. Will set it to project a view of the escarpment as it would appear out a north-facing window. Will's main addition to the office was an antique hutch in the northeast corner that he had imported from Spain several years earlier. On it was a coffee maker, a samovar for tea, and some simple refreshments so he could serve guests.

Huma Mubarak, his secretary—her office was right outside the door—was busy setting up the hutch for him for the first time. "No more imported tea," she commented.

“No; the Chief Minister has to serve marjeeling.” Will pushed a button to activate the screen of his attaché. It showed a hundred new messages from old friends, Earth politicians, journalists, and local people. “Start by doing triage on my inbox.”

“I’ll assign that to Johann. We need to change your primary address and set up a bunch of filters, so your messages are automatically routed him first.”

“Do you have the old whitelist? I suppose I need to update it.”

“I’ll do that and run the changes past you. Don’t forget your 10 a.m. appointment with Silvio and your 10:30 with Alexandra.”

“I haven’t.”

Just then there was a knock on the door. They looked up; Ramesh was standing in the doorway. “There wasn’t anyone in the outer office, so I thought I’d see whether I can talk to you some time, Will.”

“Sure, come in, Ramesh. I have a spare five or ten right now. Tea or coffee?”

“Coffee, please.”

Will nodded. He walked to the hutch. “You’re the first person to receive a cup in the new office.” He began to pour.

“Really? And you’ve been in office for two sols, now.”

“Alexandra wouldn’t vacate the office until after the inauguration, so we spent yestersol setting it up.” Will handed Ramesh his cup of coffee and sat with him in the chairs. Huma brought Ramesh milk and sugar and discretely left the room.

“And what’s happening with the Saturn Commission?”

“They have to find a new director, and since it’s an international appointment with political and diplomatic implications it’ll take months. Launch is in two years and

there's a lot to do. So I'm serving as acting director until they replace me and I'll appoint an assistant director to do all the work."

"I saw in *Mars This Sol* a list of the positions you need to fill."

"Ministries for External Affairs, Treasury, Human Services, Justice, Commerce, Development, Exploration, Interplanetary Transport, maybe an Assistant Minister of External Affairs, a few ambassadors to specific countries, six Supreme Court justices, Commonwealth representatives to the Boards of Trustees of four semi-public companies. . . and they all have to be approved by the Council, and they're all needed now. . . "

"Quite a bureaucracy."

"An entire government! We've displaced all the renters from Capitol Annex South and are finishing offices. I also have to give a 'State of the Commonwealth' address stating my priorities for the next two annums and embody them in a budget for the next annum."

"And you haven't time to think about priorities."

"No, though we still have two years left to the Commission's development plan, so we can modify it as needed."

"How will you appoint ambassadors?"

"Probably give Marsian citizenship to a few old, reliable Commission bureaucrats, appoint them, and fly them here for consultations next columbiad. Now, what can I do for you?"

"I thought I'd ask you whether you'd like me to submit information for any of the positions, such as Minister of Commerce."

“Hum.” Will considered. “Frankly, I won’t be doing you a favor by appointing you to such a position. Right now as C.E.O. of Aurorae Construction you have far more responsibility. The Minister of Commerce will probably have a staff of eight to twelve. These are big titles and responsibilities, but for a nation of only five thousand people.”

“Won’t some work be outsourced to Earth?”

“Sure; the eight jobs are here. Maybe the Minister will have a few dozen employees in Bangladesh or Eritrea or Burma. But that’s still a small job pool. The Minister of Commerce will be responsible for encouraging and coordinating private enterprise, both the big, semi-public firms and small business, which means lots of business loans. He or she can’t be a C.E.O.; it’d be a conflict of interest.”

“I see. I understand.” He sounded disappointed.

“Minister of Transportation is similar. Its big responsibility will be road building, which you already did for the Commonwealth. It’ll run the airports and spaceports. But it won’t own aircraft or spacecraft; they’re going to two new semipublic companies.”

“And External Affairs?”

“Minister of External Affairs handles our relations with Earth. The person has to have a lot of terrestrial governmental contacts. The job may require spending most of one’s time on Earth.”

“And Minister of Development?”

“That ministry spends money to expand our infrastructure. If the Ministry of Interplanetary Transport decides we’re getting a thousand people in the next annum, Development makes sure the money’s available to build their housing and work space, import their equipment, etc. It’ll also subsidize expansion of the export sector.”

“What does Finance do?”

“Collects taxes and other revenue, proposes a budget to me, modifies it as I request and the Council approves, and oversees expenditures. It’ll also manage the currency, assuming we keep the redback.”

Ramesh nodded. “Well, don’t rule me out from any of these positions just because I’m a C.E.O. right now. These are the kinds of responsibilities that intrigue me. I need to change tasks every few years in order to keep fresh.”

“True, and you are a bright, creative man, Ramesh. I value your contributions to Mars and want to see them expand. So I will keep your offer in mind. And whatever decision I make, my door is always open for you.”

“Thanks. I appreciate that, Will.” Ramesh gulped down the rest of his cup and rose from his seat. They exchanged a few parting words and he left the office.

Huma stuck her head in. “Sorry about that. I should have locked the outer door.”

“No, that’s okay. I need to be accessible to people.”

“I know, but he was asking for something.”

“Ramesh’s always asking for something. He wants to be Chief Minister some day.”

“Like a dozen other people.”

“He’s bright and I want to encourage him, but he needs to be C.E.O. of Aurorae Construction another year or two before I give him a promotion.”

Huma stepped back out and Will turned back to his work. His inbox now had a mere dozen messages; Huma was fast and efficient. One was a list of changes to his whitelist filters that let some messages through. She moved David Alaoui and other old

friends off the list; he put them back on, but approved the removal of the Commander of Concord Station, Mercury, Magellan Station, Venus Orbit, and all the moon station commanders. He was no longer one of their colleagues. If they messaged him, Huma would have to scan it and decide whether to forward it to him or summarize it.

Two were emails from journalists with whom he had a long relationship. One wanted an interview; he forwarded it to Huma so she could schedule it. The other asked a "background" question. He forwarded it to the Director of Communications, his nephew's wife Jacaranda Nuri.

Huma buzzed to announce Silvio had arrived. He rose from his desk as Silvio entered. "It's good to see you this sol, Silvio. I need advice about the Supreme Court."

"It's an interesting problem. We don't even have six more lawyers up here."

"I guess we can be thankful for that. Here, sit and let me pour you some coffee."

"Black, no sugar."

"Alright." Will walked to the hutch and poured a cup of coffee and a cup of tea for himself. "You've hit the nail on the head. We have four lawyers up here. I suppose we'll continue our custom of having them alternate between judge and attorney. But I want to ask Indira Kumar to serve as Attorney General; she's young, bright, and I think would do a good job. The Attorney General shouldn't sit on the Supreme Court as well."

"I agree, that's one position that should be completely separate."

"I propose to fill the other vacancies not with lawyers, but with wise and experienced persons who have been on Mars a relatively long time and have governmental experience. They'll form a body that is diverse ethnically and ideologically. The three attorneys on the court will have to make sure the decisions

follow reasonable legal theory, but the other six, like a jury of citizens, will provide the common sense and broad experience."

"That's the best we can accomplish, considering the circumstances. What you suggest has other advantages as well because any serious case will have a defense attorney, a prosecuting attorney, and a local judge; three of our four lawyers. If a case is appealed to the Supreme Court the three of them should recuse themselves. The court majority should have no connection with the case. Who do you have in mind?"

"Alexandra Lescov, Ruhullah Islami, Madhu Gupta-Anderson, Shinji Nakatami, Andries Underwood, and Ni Gao; a Russian, Iranian, Indian, Japanese, South African, and Chinese. You're Italian and we have two judges who are American and Chilean."

"But four are on the Council."

"We'll leave that problem for the Council. I'll suggest that they serve on both bodies, but I don't think a majority of the Supreme Court should be on the Council, and as we grow, in another decade I think no one should be on both."

"Alright. Ruhullah couldn't serve as Clerk of Aurorae."

"Agreed. One problem I see: only two live outside Aurorae. One is in Cassini and one in Uzboi."

"That's not a problem, with regular flights. I know and can work with all of them."

"Excellent. Then that's the plan."

"I'm glad this went so easily! How many more appointments do you have?"

"About fifteen!"

"Good luck; I'd better leave you to them. Thanks for the coffee."

"Any time, Silvio. The door's always open for you."

“Thanks, and good luck with your new responsibilities. We’re all doing these things for the first time, so we need to help each other. Let me know what I can do.”

“Thanks, I appreciate that. Let me know how I can help you, too.”

They rose and walked to the door, where they shook hands and Silvio went on his way. Will had a few minutes to ask Huma to schedule meetings with the potential Supreme Court members, then Alexandra arrived. Huma escorted her in and Will walked to the door to welcome her. “Good sol, Alexandra. Come in.”

“Thanks, Will.” She entered and looked around the office. “Not too many changes. I like the hutch; it fits the décor pretty well.”

“I thought so, too. Shall we have tea and cookies out on the balcony?”

“Sure. I often worked out here.”

Will set up a tray; Alexandra helped. They chatted about children; Boris was now fifteen and interested in mechanical engineering, and she wanted to know how Marshall was doing with the plans for Saturn. Then they slid the pressure door with its heavy glass windows into their slots in the wall and stepped out onto the balcony.

“I can’t remember whether this meeting was your idea or mine,” said Alexandra.

“I don’t remember either. I’m glad we ran into each other in the Gallerie last night. We have some fence mending to do. We’ve ended up on opposite sides of several issues in the last year and I’m sorry about that.”

“We both did what we thought was right. I must say that I find your ability to change your mind about things to be. . . maddening. It’s indecisive.”

“Maybe we draw lines in different places. Most people don’t see me as being an equivocator. My position on independence was consistent; it would come eventually and

I would support it when the time came. I know you took the position that it should be considered in five years. That's fine. When it was clear the people were voting for independence, I supported them because they had decided the time had come. The national representatives were furious, but decided to ask me to join their negotiating team, and I turned them down on the grounds I was no longer on that side of the issue. If they had insisted I would have resigned as Commissioner. As for the Constitution, I made the best contribution to it I could, and a majority of voters who voted approved it. But we all know Mars usually gets an eighty percent voter turnout or better."

"So, are you planning to propose an amendment?"

"Of course! I said so. It'll be in my 'State of the Commonwealth' speech and I will be active on the issue."

"Good, that's consistent. I supported the Constitution as written and would have accepted the vote as is. You got almost a majority of the voters mad at you supporting the Constitution, and now you'll get the third who voted 'yes' mad at you too."

"I don't think so. The bigger issue is what's right for Mars. I think we can set up our founding principles in a different way that will get support from more than a third of the voters, and I don't think it's wise to run a nation on principles supported by only a third of the electorate. This is not to say that the voters should decide all major aspects of governance. I don't think most Marsians want that burden."

"Perhaps not." She sighed. "I opposed immediate independence and then supported the Constitution—just like you!—and the voters were not pleased, so you're Chief Minister and I'm out." She shrugged like it made no sense at all.

Will wasn't going to respond to that. "After a vacation, what do you want to do?"

“I don’t know. During my absence from the Commission you privatized all my jobs.”

“We ended up hiring three people to do them, too. But you can’t go backward anyway. You need something new.”

“Like what?”

“I don’t know. I assume you don’t want to go to Earth and serve as ambassador.”

“No, something creative that relates to my skills and experience.”

“Minister of Development is responsible for planning infrastructure. But I wonder whether you’d be better suited to designing galleons. You have an incredible designer’s eye, Alexandra. The caravel reflects your creativity. With the galleon, they’ve simply expanded the design of the caravel.”

“I know, and I don’t like the result. I’d really enjoy serving as a special consultant on the galleon. But that’s out of your hands.”

“Not completely; I can make some recommendations.”

“Well. . . I’d appreciate that opportunity.”

“Okay, I’ll talk to Louise. I do have a governmental position to offer you, though. It involves only a few weeks of work per year, but it requires extensive governmental experience, and you have more of that than almost everyone.”

She was intrigued. “What?”

“Membership on the Supreme Court.”

She looked at him a moment, then laughed. “Supreme Court? I’m not a lawyer!”

“Mars has nine slots on the Supreme Court and four lawyers, and some of those attorneys have to serve as attorneys. So in addition to Silvio and our other two Chief Justices, I plan to appoint six experienced senior members of our community.”

“I figured you’d import lawyers.”

“They wouldn’t know our culture, and if you look at the history of Supreme Court decisions in various nations, you’ll notice that sensitivity to the current cultural climate is important. That’s what makes a Constitution a living document; every generation has to reinterpret it. The position won’t take much time and doesn’t include a full-time salary.”

“But I’m on the Legislative Council.”

“The Council will have to consider that matter. I plan to appoint no more than four members of the Court who also serve on the Council. Once Mars is big enough, the bodies should have non-overlapping memberships, but we aren’t there yet. In a decade or so, the Supreme Court can declare the current arrangement un-Constitutional and that’ll solve the problem.”

“That’s pragmatic.” She considered. “Alright, I’ll accept the nomination.”

“Good! I’m delighted. I hope the Council approves.”

They continued to chat about various decisions they had agreed on or differed over in the past until Alexandra glanced at her watch and apologized she had another appointment. After she walked out, Huma could see he was pleased. “Did she agree?”

“Yes, to a nomination to the Supreme Court. It’s a good fit for her experience. How are the appointments going?”

“Ni’s coming at 2, Andries at 2:45, Madhu at 4, Ruhullah can stop by at 5, and Shinji agreed to tomorrow at 3.”

"Great. I need an appointment with Érico; he's the logical person to serve as Assistant Director of the Saturn Commission. I need to meet with Indira Kumar about Attorney General and Yevgeny Lescov about Interplanetary Transport. Also, videomail Krister Soderblom to set up a time we can exchange messages; he'd make a good Ambassador. I want to talk to Emily Scoville-Rahmani about Development, Pete Theodoulos about External Affairs, and Andries Underwood about Exploration. Set up an appointment with Lal; as Speaker of the Council he's number two in the government. I want to brainstorm with him."

"Yevgeny, Andries, Emily, and Pete are all members of the Council."

"I know. We're going to have to consider how much overlap we want with these bodies; the rule of thumb I'm going with is less than half. But we're too small to have complete separation. And Huma, you and I need to talk for an hour. I don't need a secretary as much as I need a Chief of Staff. That's a much more important position."

She was startled. "Chief of Staff! Of how many staff!"

"Well, we have three right now. We'll need more here and some on Earth. But I can't manage that as well. We need to meet and talk about what help I need."

4.

The Wave of the Future

early July 2066

Liz was relieved to see Mike arrive at supper. She was almost finished eating; the Gamma Dome construction crew almost always worked late. He walked straight to her table and gave her a kiss.

"How are you?"

"Pretty good; you?"

"Tired. Let me get some supper. How does it look?"

"Edible. The tilapia with rice is okay."

"I'll try it; vegetarian lasagna doesn't impress, after ten hours of hard work." He walked to the buffet table and filled up his plate, then returned. "The quantity isn't good."

"No, when you arrive late, some people have already gone back for seconds."

"Taking off a suit takes a lot of time."

"You were outside? I thought you were finishing off housing in North Eight?"

"It's mostly finished; we finished spray painting yesterday, and a smaller crew was working on installing carpeting today. But Krishna needed some help on the dome's cooling system, so three of us worked on it this afternoon. Gamma's got 10,000 tonnes of water in its roof! But until the dome is inflated there's no thermal load to remove, so the water is freezing solid."

"I hope it isn't bursting anything."

"So are we! It's designed for that contingency, but no one wants to take a chance, so we've been upgrading the water line connecting Gamma and Alpha. Alpha's water is as much as sixty Centigrade."

"That should solve the freezing problem for a while."

"We think so. Working outside's a pain. You have to limit hours because of radiation exposure, and lighting is a huge problem; either you're in full sun and have to worry about excessive heating and you have too much light, or you're in shadow and can't see a dang thing without your helmet light. I can see that the field trip in October and November isn't going to be as easy as one on Mars."

"What about solar sailers?"

Mike shook his head. "They can't illuminate an area much above full moon levels. Floodlights on a boom above each vehicle are better. I can't imagine how one does field work, even along the terminator. Helmet lights are fine for looking at specific objects, but they're inadequate to *find* specific objects. Well, I'll find out sooner or later. How was your day?"

"Alright. I worked in the school and early childhood education center all day, getting to know the kids. They're all pretty good. Everyone wants me to dance, but I've got no time to practice!"

"It's crazy. Let me eat, I'm starved." He turned to his plate of food and began to shovel it down; when he was hungry he could eat with amazing speed. Liz rose and got herself a cup of tea and brought Mike his usual glass of diet coke. As she sat, Christina Andropoulos and her husband, John Aylmer, came over to join them. Aylmer was a geologist as well; the two of them had spend three nineteen-month rotations at Magellan

Station studying Venus volcanoes and two four-year rotations on Mercury. They were among Concord's veterans. The station had eight couples with children who had a long-term commitment to Mercury plus three other couples, including John and Christina, who planned to stay long-term but didn't have children.

"We figured we shouldn't come over right away; we wanted to give the two of you a chance to catch up," said Christina. "I talked to Olaf today about the fall schedule. He wanted to postpone the field trip, but we talked him out of it. You're coming along, Mike. I thought you'd like the good news."

"Thanks, that is good news. After a week, I'm already tired of construction."

"Once forty arrivals get here next month, you'll move way up on the seniority list," added John. "You'll be doing a lot of science after that."

"We want to make sure the new people understand the importance of an elected leadership, too," added Christina. "What can you tell us about the Marsian system?"

Liz shrugged. "What do you want to know?"

"And are you talking about the old system of the new one?" added Mike. "I only know about the new one."

"I'll be more specific, then," said Christina. "Next month the *Olbers* and *Piazzi* leave for Ceres with a crew of fifty, plus seven children, and as soon as they arrive they're electing a three-member Council including the outpost Commander. Helmut Langlais has said he will respect the result of the vote. Yet here we are with twice that number and we elect a toothless Council that oversees children's education and the arts."

"And until you arrived, we didn't have any arts," added John.

“I see,” said Liz. “I don’t know anything about the arrangement for Ceres. I heard they were trying to arrange a real election and the Commission was dragging its feet. We’ve had elections on Mars since 2040; my brother Marshall’s arrival triggered the first election because of the legal complications over registering his birth. The main difference with terrestrial elections was that when we were small and everyone knew everyone else, we decided to vote without any campaigning or nominating. That was partly because my father was a Bahá'í and that’s how Bahá'í elections are held, but it also felt right because no one wanted an ugly fight to break out over elections, because we were few and living close together. It’d be a good arrangement here because everyone knows everyone else.”

Christina looked at John. “There wouldn’t be an opportunity to discuss Olaf’s failures.”

“That could be a problem,” he agreed.

“Wait a minute,” said Liz. “It’s exactly that discussion that could cause rancor and bad feelings in a small crew. Whether you defeat him or not, after a campaign of that sort, some people here will barely speak to each other.”

Christina shrugged. “That’s democracy.”

“That’s one kind of democracy,” exclaimed Mike. “You should read the series of articles Will Elliott published in *Mars This Sol* a few months ago. I’ll find them for you. He made a very interesting point in one of the articles. Elections should focus on choosing a leader, and that means focusing on the important issue of character. We don’t need a leader who will do X or not do Y as much as we need a leader who will be honest, who will listen, be decisive, is mature, wise, and experienced. When a group is small like the Mercury community, people need to be educated about the qualities of character their

leader should have; then they need to consider the people they know and make a private decision who they think comes closest to those characteristics."

"But how many voters do you now have on Mars; 3,700?" asked John. "It's impossible for all of them to know everyone, so how can they judge character?"

"That's why Mars is divided into electoral districts," replied Liz. "We elect representatives to the Legislative Council according to a formula enshrined in the Constitution. Each district chooses two to four representatives, unless the borough has only one representative. The Legislative Council members elect the Chief Minister, who can be anyone on Mars. The representatives are supposed to know people and spend time thinking about who to vote for."

"So that's why the Chief Minister is not popularly elected," said Christina. "But the Borough Clerks are elected, right?"

"For the time being, yes," said Mike. "That's not in the Constitution, it's in the Bylaws of the Boroughs."

"I suppose we'd have two boroughs and a station," said Christina. "Caloris has a permanent crew, but south pole doesn't. How small can a borough be and elect its leadership?"

"Aurorae held its first election with a dozen. Cassini had maybe twenty-five and Elysium had maybe thirty," replied Liz.

"I suppose the big debate is how much authority the leadership should have and what the role of the Venus-Mercury Commission should be," said John.

“With only one hundred of us, we certainly don’t want sovereignty,” replied Christina. “Heck, Mercury only has about twenty ‘permanent’ residents. The rest stay two or four years, then leave.”

“This is a hard place,” agreed Mike. “It’s not like Mars, where you can go outside any time. Here there’s the problem of radiation and light; too much, or none.”

“Even the insides of the domes are different,” added Liz. “On Mars you can look outside. The domes are not perfectly transparent, but you can see the landscape pretty easily and you can see the sun and sky. You feel like you’re outside even when you’re in a dome. Here, you’re enclosed.”

“Entombed,” added Christina. “It takes some getting used to, and a few never adjust. You have parks, too.”

“Parks and bioarchives,” added Liz. “Every square centimeter here is devoted to intensive agriculture. We have places children can run around and where you can get lost.”

“Gamma will help,” said John. “Once it’s done, we’ll have an entire hectare—ten thousand square meters—of enclosed green space. We can feed a hundred people on seventy square meters each, so we’ll have three thousand square meters to spare. That’s the size of either Alpha or Beta. We’ll have the space to create a lawn.”

“And a swimming pool,” added Christina. “This place has to grow, and I hope it will with cheaper transportation, but we must maintain a reasonably large amount of green space per person; I’d say 110 square meters at least, maybe 125. This is something all of us should discuss and reach a consensus about, and the Commission should respect our position, because we’re the ones living here.”

John nodded. Mike said, “Delta could be built in two years, just like Gamma.”

“What are the expansion plans?” asked Liz.

“That’s a good question!” exclaimed Christina. “We’re the last ones to know! Your father took a leadership role early and was central in planning Mars’s expansion, and he talked with everyone else on Mars, so they were in the loop. But Mercury’s future is planned by the national representatives in consultation with Commissioner Alaoui, who’s never been here, so we aren’t consulted at all.”

“But surely Olaf is consulted?” asked Liz.

Christina shook her head. “Hardly ever.”

“Wait a minute, he was involved in the decision to fly caravels from Earth to Mercury and to Mars, then back.”

Christina shook his head. “No, I don’t think so.”

“Christina, I was with my father at Shackleton when they talked about it.”

She hesitated. “Well, maybe that was an exception.”

Mike changed the subject. “I’m surprised flats aren’t for sale. On Mars everyone buys their flats, which means they kick most of their salary—hundreds of thousands per year—back into the Marsian economy. Here, no one owns their flats or improves them.”

“I don’t think anyone could afford them anyway,” said John. “Importation costs are so much higher, they’d be out of reach.”

“Then you raise salaries or subsidize,” replied Mike. “There are solutions.”

“I suspect most people here wouldn’t want to buy their flats,” said John.

“They have to be given incentives. If this place wants to become permanent and to grow, residents should own property.”

“Back to planning,” said Liz. “Mercury’s about to grow from seventy-seven to one hundred-one. When did everyone find out about that?”

“Last year,” replied Christina. “When the Commission published the plans. The decision to expand from fifty to seventy five was announced six years ago and accomplished five years ago. Similarly with the expansion from twenty-five to fifty and twelve to twenty-five; residents learned twelve to twenty-four months in advance and never were asked.”

“This is one reason we’re so frustrated,” said John. “As far as we know, there is no master growth plan. Growth happens when the national representatives can be convinced to spend the money. Solar sailing technology caused cargo shipping costs to drop to a third of what they had been eight years ago and importing from Mars cut them in half again, but did we get more cargo? No, the national reps just cut their support. Now caravels fly 150 people at once instead of twenty or thirty by flying the rest to Mars and that cuts the cost of flying personnel here to a quarter of what it was. If the budget hadn’t dropped, why couldn’t Mercury have grown from fifty to one hundred fifty or two hundred?”

“And we have to grow,” added Christina. “This is a big, fascinating, complex world; seventy-five million square kilometers of craters, volcanic plains, tectonic features, a huge metal core, an active magnetic dynamo, glaciers in the permanently shaded polar regions. . . no reason it shouldn’t grow to two hundred, then five hundred, then a thousand people. Think of the science we could do.”

“What about exports?” asked Liz.

"Eventually," replied John. "The problem is the cost of doing business. Enclosures are five times as expensive per square meter in the polar regions of Mercury as on Mars. At Caloris—the hottest part of Mercury—any enclosure has to be buried under ten meters of regolith because of the roasting heat of the dayspan and they have to be built during the nightspan or in tunnels, so they cost ten times as much per square meter as on Mars. Mining gold at Caloris requires immensely expensive infrastructure. The gold has to be hauled back here by robotic truck during the nightspan for launch to Earth, and all supplies have to be sent to Caloris during nightspan as well. As we gain experience and improve the technology, the costs will drop, but they haven't yet."

"Frankly, I wish we'd stick to science," exclaimed Christina. "Mercury's unlikely to cover even a fraction of its costs any time soon. Gold mining barely breaks even right now. Olaf's pushing a useless corollary to expansion."

Just then she looked up and saw Olaf approaching the table. She smiled at him deferentially as he stopped to talk to Mike. "Did Christina tell you?" he began. "You're scheduled for the field trip that starts October 30."

"Yes, she told me. Thanks."

"And Liz, for the welcoming dinner on August 5th we were hoping you could do a dance. How much rehearsing time do you need? Would two afternoons per week be sufficient?"

"Yes, I think so," she agreed, pleased to be given the chance.

"Good. Gamma's now scheduled for inflation July 31. Construction on the frame is mostly finished. After the new people arrive, the schedule will get much easier."

"Are they planning for a Delta Dome?" asked Mike.

“I asked for Delta—75 meters across, just like Gamma—about a year ago. We’ll see. The arriving crew includes twenty-five people with primary training in construction and they have to be employed either building or mining. I hope that means we can expect expansion.”

Mike nodded; Olaf waved and headed out of the cafeteria after Oxana and their two kids. Christina looked surprised. “You got more out of him than I’ve extracted in months.”

“Luck, I guess,” replied Mike, with a smile. He looked at Liz. “I’m done; shall we go?”

“Sure. See you again Christina, John.”

“Bye,” they replied.

Liz and Mike rose and bussed their trays, then headed home. “What do you make of the situation?” asked Mike after they left the cafeteria.

“Christina has a lot of personal jealousy and animosity. She isn’t fair to Olaf; he’s more creative and involved than she says.”

“I agree. I’ve talked to several long-term residents and many seem to dislike him. I think we’re in for a rough ride over the next few months.”

Sebastian’s flat was full of family: Helmut and Clara were there, with Charles, almost 13, and Oskar, 4 ½; Kristoff and Irma were there with twins Nicola and Mark, almost five. The living room echoed with the sounds of the three younger cousins, chasing and playing, while Charles sat with the adults and pretended to be above the chaos. The pizza

was just about finished, so Sebastian rose and brought over the coffee pot. “Refills?” Most of the adults nodded, as did Charles, so Sebastian rationed the pot until it was gone.

“I doubt we’ll need more,” he said. “So, Kristoff, what are you going to do? I think you should go to Ramesh calmly and patiently and say that if he doesn’t honor the contract, you’ll sue him, and leave it at that.”

“And sue him?”

Sebastian nodded. “You have a contract for use of the ‘mall’ or ‘meadow’ or whatever they’re calling it for an entire annum. If he wants to terminate the contract early, he has to compensate you. I don’t think Ramesh will want public embarrassment.”

“I agree,” said Helmut. “His public image is very important to him. He’s an ambitious man and knows Mars is a place where your ambition has to be expressed in a restrained fashion. Reputation is important here.”

“He should know that by now,” agreed Sebastian. “I don’t know why he’s in such a hurry to develop ‘the Meadows’ anyway. He can leave it in clover and build around it.”

“I think I know,” replied Kristoff. “His finances are strained. His salary’s about a million a year, but the house and meadows cost him about five million. He arrived with money from Earth, but a good sized terrestrial fortune doesn’t go far up here.”

“Then he definitely won’t want a court case,” concluded Sebastian. “Go to him calmly and tell him what you expect. No need to raise your voice; being calm will work better with him. Flatter him a bit and tell him that otherwise you ‘will have no choice but take the case to an attorney.’ I think that’ll work.”

“And if it doesn’t, I’ll approach Sarah,” said Irma.

Clara shook her head. “No, that won’t work. She’s not assertive around him.”

“Well, don’t let him sweet-talk you, Kristoff,” continued Irma. “Ramesh plans to sell twenty house lots and make a fortune. He can give you a fair payment.”

“Don’t worry, I’ll get my due,” replied Kristoff.

“I’m going to miss this exchange,” said Sebastian. “Video from Ceres just won’t work. You all have to hurry back.”

“Eight years,” said Helmut. “We’ll stay six; that’s what I’ve pledged. Charles will be twenty-one and will need to get a university education.”

“And I’ll be 82!” said Sebastian. “I hope I make it that long. I want to see all of you again face to face.”

“Oh, dad, you’re fine,” said Helmut.

“I know, but I can’t seem to retire! Will gets elected to the position of Chief Minister and has a seat in the Council by virtue of his office, so one of the Aurorae seats are empty and I’m the runner up, so I fill it automatically. Now I have to think about cabinet appointments and supreme court justices. Then Charles Vickers accepts the command of the American facilities on Callisto and I become acting Commissioner of the Asteroid Belt Commission again.”

“You could have said no,” observed Clara.

“They’re interesting challenges.”

“When will the ABC have a new Commissioner?”

Sebastian shrugged. “Not long; two or three months. Just as well; it’s strange being Commissioner with my son as commander of the Ceres mission. I can’t praise him as much as I want to.” He looked at Helmut and his eyes said “I’m proud of you.” Helmut smiled back and said nothing.

"Well, I can say 'I'm proud,'" added Sebastian, seeing the silent exchange between his father and brother. "Forty-four and in charge of a major expedition, two ships and almost seventy people. . . it's pretty exciting, Helmut. You've got to come back, you have a future in politics here. You can provide leadership."

Helmut laughed. "I'll leave that to Ramesh."

"Lord, no, don't do that!" said Irma. "For once there's a society where people who aren't ambitious get elected to something. . . let's not give it up to the ambitious."

"Let's see how Ceres goes, first. Who knows whether I'll get elected Commander of Ceres operations once I arrive."

"I'm still amazed the Commission agreed to that arrangement," said Kristoff.

"Elections are the wave of the future," replied Sebastian. "We're not sending out missions any more, we're establishing communities. That's not just a slogan; it's a new philosophy."

Helmut looked at Charlie. "How are you feeling about the voyage?"

"I'll be taking all my classes here by video, which will be a pain, and I won't be able to play with my friends, which will be a drag. But I'm hoping to be the world champion at Ceres aerial hockey."

"Aerial hockey?" asked Sebastian.

Charlie nodded. "Sure! I remember when we were there last putting on wings and flying in the gym cylinder. Well, one could play hockey with wings, with two teams and two goals. So I want to help invent the game!"

"That's his ambition for the trip," explained Helmut. "It helps reconcile him to the trip away from Mars."

“That’s a good plan,” said Sebastian. “I want to watch such a game some time.”

“When’s trans-Ceres injection again?” asked Irma.

“Two sols,” replied Helmut. “We leave at dawn tomorrow and it’ll take up to twenty-four hours to reach Gateway. The two caravels and their SCN-60s are ready to go and most of the crew is there already. The cargo’s already on the way to Ceres.”

“And the SCNs have to work at Ceres; otherwise you’ll fly right by,” said Irma.

Helmut shrugged. “That’s the price you pay when you go there in half the time a Hohmann trajectory takes! But each caravel has a pair of SCNs, so we have four nukes, and one SCN can put both vehicles into orbit around Ceres. If something goes wrong, the trajectory will take us to Jupiter where we can be rescued or where we can use limited engines to return to Mars or Earth. We shouldn’t have any trouble, don’t worry.”

5

The State of Things

July 20-Aug. 6, 2066

Will Elliott descended the ramp from his third-floor office to the first-floor entrance to the chamber of the Legislative Council wearing one of his two good suits. Ethel accompanied him in one of her best outfits. Outside the door to the chamber, she stopped him to straighten his tie. “There. It’s a minute before 7:01 p.m., so you’re right on time. Let me slip in through the side door. I don’t want to be part of a grand entrance.”

“Neither do I.” Will looked down the hall at the side entrance. “I think I’ll go in that way also. But I’ll give you ten seconds head start!”

“Thanks.” They both walked to the side door and he opened it to let her in. He closed the door, counted to ten, then opened it again and walked in, heading straight to the center of the chamber.

His side entrance caught Speaker Lal Shankaraman off guard. He rose. “Ladies and gentlemen, the Chief Minister!” he announced. Everyone looked around, then saw Will in front of them. They rose to applaud and “Red Mars Our Home” began to play.

“You threw off all our plans!” Lal whispered to him as they shook hands.

“Sorry, I should have warned you. You can expect me to enter through the side door from now on as a sign of respect to this institution.”

“Okay,” said Lal, pondering the idea.

Will shook hands with Chief Justice DiPonte and Council Clerk Scoville-Rahmani. Then he walked to the lectern, where he was pleased to see the teleprompter

was working properly, with the opening words of his speech already projected on the transparent glass. He could make eye contact with the audience and read at the same time. He looked at the full chamber and its attentive, respectful audience. He glanced at the television cameras that would carry his speech live on *Mars This Sol*, and to anyone watching on seven worlds. His talk would be viewed by millions.

"Mr. Speaker, Ms. Clerk, Mr. Chief Justice, members of the Supreme Court, members of the Legislative Council, Ambassadors Stark and Zhou, my fellow citizens of Mars and human beings everywhere: greetings. I stand before you to fulfill a Constitutional mandate to report to the Legislative Council once per annum about the state of the Mars Commonwealth. It is an auspicious sol to offer such a report, two months after our first elections, one month after the beginning of our status as a sovereign nation, on the ninetieth anniversary of the Viking 1 landing and the ninety-sixth anniversary of the Apollo 11 landing on the moon.

"The state of the Commonwealth is sound. Mars has 5,100 human beings, a number that will be augmented in December when two caravels bearing 270 migrants arrive from Earth via Mercury. With their arrival and the arrival of 130 more in December 2067 from Earth via Venus, we will be able to declare the death of the columbiad. Mars will no longer be tied to the transport of people from Earth every twenty-six months when Dusty Red and the Mother World are at opposition. We will also receive arrivals via our sister planets roughly two thirds of a columbiad later when Mars and Earth are just past conjunction, using the transportation systems set up to renew the personnel studying those worlds. At that point Mars will become a sending world as well as a receiving one."

He paused for the inevitable applause. “This historic change signals the maturation of the facilities on Mercury and around Venus, for they are able to provide rescue capacity; it is a revolution in transport of people to those worlds, lower their costs to Marsian levels and permitting their further expansion; and it once again places Mars in a central position in transport across the solar system. As Mars continues to grow, we will see that ‘all roads lead to Mars’ just as they once were said to lead to Rome.

“Driving our continued expansion is an export industry that remains strong. Four years ago, when platinum-group metals began to be produced at Parenago Station on the far side of the moon, we set a goal of raising PGM production to a thousand tonnes per year, a quadrupling of output. By the end of this year, with the tripling of Uzboi’s population to 800, we will reach that goal. Of course, the price of PGMs has halved, to 26 million redbacks per tonne, which means our income stands at close to 26 billion redbacks per year. Gold production has grown to 500 tonnes per year and fetches the same price, bringing us another 13 billion redbacks. We remain a small population on a vast planet bringing in considerable wealth from our enormous mineral resources. We have also retained some financial subsidies from a dozen nations that are our chief sources of migrants and supporters of research to make life here better. Because some of that income goes to the profits of terrestrial companies rather than coming to Mars, we receive a steady flow of investments. Since independence it has increased.

“The revenue provides the basis for strong immigration. Our new Ministry of Development will determine what demand for labor will exist and what resources will be needed to house and equip the migrants. The Ministry of Interplanetary Transport, headed by Yevgeny Lescov, will determine how much it will cost to transport them here and

what standards will be established to screen and train them. Contracts have been signed with six companies or agencies to screen and train applicants. Six companies or agencies will transport them. The Commonwealth government itself is a transport agent until it can privatize its operation fully. The next columbiad will see the arrival of twelve caravels bearing 1,600 people; some will be permanent migrants, some tourists, and some crew for missions to Jupiter, Saturn, and the asteroid belt. When one adds the birth of 750 children, Mars can be expected to grow to 7,500 people by late 2068. Our rapid growth, long predicted to peak, remains strong.

"With five thousand tourists going to low earth orbit and five hundred to the moon every year, the cost of getting a migrant to Gateway has dropped to a million redbacks. Getting them to Mars, however, adds several million more, and flying the cargo they need adds two million. We will cut the cargo costs in half over the next three annums by diversifying Marsian industry. The campaign will also reduce routine imports, now costing us a billion redbacks, and will increase our exports.

"Currently our equipment cannot make more than one interplanetary round trip per columbiad. This prevents caravels from being in constant service transporting passengers between worlds, which would reduce their cost per passenger. In the next year we will study the use of gaseous-core nuclear engines as a potential solution. If we want Mars to grow to millions, we must have cheaper and faster transport.

"More than half our budget will be devoted to the cost of migration and a third of our workers will be occupied with expanding our facilities to accommodate arrivals, but we have other priorities as well. Eight billion will go to technological development and exploration, including our outward expansion into space, conducted by the Mars

Exploration Agency. Marcraft will complete the first galleon at our assembly facility on Phobos. We will support gaseous-core nuclear engine research conducted by the United States. We will cooperate with various Commissions to develop new cryogenic materials to manufacture habitats and domes that can function in the outer solar system and will invest in robotic technology for exploration of distant places. We will join the Venus-Mercury Commission, the Asteroid Belt Commission, the Jupiter Commission, and the Saturn Commission, buying a voice for Mars in the exploration of the solar system and reinforcing our central role in human expansion off-Earth. Exploration's budget, as a percentage of GDP, will be comparable to the budgets of some nations' militaries, for Mars, as a world at peace, has no need for a military.

"Mars, however, needs greater capacity to deal with emergencies. A shuttle crash into an outpost could endanger the lives of thousands. For this reason the Department of Justice will establish a Ranger Corps. The Rangers will be responsible for public safety, which means they will have a small nucleus who will serve as a national police force and will assist the local constabularies. But there will also be members who, like a national guard, will serve for a weekend every few months, primarily to receive safety training. In an emergency the Rangers will be mobilized to rescue trapped persons. A particular focus of their training will be fire fighting, a potentially serious danger inside our domes.

"The Treasury will face a major challenge in the next annum as it manages the redback. At a time when currencies on Earth are being consolidated together into a few major currencies, the redback is not part of a major currency block. Abolishing the redback and adopting another currency such as the dollar, euro, or geo must be carefully considered. Mars has to integrate more closely into the economies of Earth if it is to

grow, but the timing of that integration, and the phases it will follow, must be carefully considered.

"Closely connected to the future of the redback will be the development of our Ministry of External Affairs. Building close, strong, trust-filled, and deep relations with the nations of Earth will be a high priority. Many people see us as a neutral voice above the petty politics that disturbs the calm and delays the hard decisions that often have to be made. Mars will seek to be an articulate voice favoring deeper ties binding the children of men into societies based on the rule of law and consultative democracy.

"Domestically, we will have two other priorities over the next two annums. First, we must open a gold-producing outpost at Tithonium; recent discoveries of additional gold reserves make it profitable. It appears likely that a gold-producing outpost will be needed in Alba Patera as well. Second, I will send a constitutional amendment to the Legislative Council that will abolish the Landowners Assembly." Will had to pause because of the strength of the applause in the chamber. "I championed the Landowners Assembly repeatedly as an innovative way to involve ordinary people and corporations on Earth in the settling of the Red Planet. It did this. But now Mars is an independent and sovereign nation and its people have made it clear that they do not feel the measure to be appropriate. I had hoped we could modify the Landowners Assembly in ways to make it acceptable, giving each land owner one vote regardless of the size of the plot owned. But recent polls make it clear that Marsians do not favor that compromise either. So I propose to abolish the Landowners Assembly as a part of government. I urge the landowners to continue the body as a nongovernmental organization through which they can express

their desires. All of the Legislative Council's members are land owners and thus already represent that interest in our government.

"Such are the tasks I seek to accomplish as I begin a two-annum term as your Chief Minister. Through hard work, generosity in sharing our resources with others, cooperation with like-minded persons and organizations, and unity at home, we can bring Mars from strength to strength, develop our new branch of civilization, and provide a model for others can emulate. Let us set our feet on this path tonight and build up our adopted world that we have come to love. Thank you."

He stepped from the podium to strong applause. He headed for Ethel, seated on the side in the guest area, but had to stop and shake hands with various people who sought to congratulate him. "Good speech," said Lal.

"Thanks," replied Will. "My chief of staff is work on the language for the bills, with Indira's help and your new assistant's."

"We'll schedule the next session for October. Everyone wants to finish approving or rejecting your Cabinet and go home to their jobs."

"Three months; that'll be enough time to get everything ready. We'll operate on an interim budget until then."

Will shook hands with Silvio, who also congratulated him and commented about the debate about holding positions in two branches of government at once; the Council was set to discuss it next week. Then he turned to Ramesh. "Good speech," said Ramesh. "But I was surprised you said nothing about highways and urban development."

"Aurorae has an excellent urban development plan, thanks to your careful work, and the highway plan will have to be revised if we establish an outpost at Alba Patera."

“But what about centralized growth versus growth of the other outposts? That has to be resolved.”

“That’s not addressed in this speech, but will have to be later, of course.”

“And the Rangers? Will they be quasi-military? How many will be police and how many emergency workers?”

“We’ll see, as the plans are fleshed out.”

Concord’s cafeteria had never seen such a crowd; one hundred filled it to capacity. Earlier that day two shuttles had landed with forty-five arrivals. Three days earlier, twenty had departed for Mars.

“This is a much more sumptuous feast than they offered us when we arrived,” Liz observed, looking over the finger foods that were set out before the welcoming dinner.

“We were just six arrivals,” replied Mike. He pointed. “They pulled out frozen jumbo shrimp! They’re imported from Earth!”

“I wish we shrimp on Mars,” said Liz enviously. They walked to the table and grabbed some shrimp and cocktail sauce; they were going fast. Pierre and Brenda Benet were there as well. “How’s your work going, Pierre?” Liz asked.

“Oh, alright,” he replied.

“I’d say too well,” replied Brenda. Liz was puzzled and Pierre irritated by the remark. Then Brenda added. “It’s too soon to say about most of the couples he’s been treating, but meanwhile, we’re pregnant.”

“Oh? I was wondering why you didn’t return to Mars three days ago,” said Mike.

“I’m afraid our return is delayed by about four years,” replied Pierre, sighing.

"If it's safe to haul a four year old across the inner solar system," added Brenda.

"It should be. It'll be close to solar max, so the sun's magnetic field will keep the cosmic rays at bay, and the caravel will minimize solar radiation," said Pierre.

Liz didn't know what to say to the Benets; it was both ironic and amusing that the fertility doctor had trouble controlling his own fertility. She spotted someone she knew among the new arrivals. She poked Mike. "That's Patrice Domkowski. He was on Mars for Columbus 3 right before I was born, then on the moon, then on Mercury for five years, then back on Earth. . . now he's back as Commander of Caloris."

"Wasn't he commander here for a while?"

"Yes, for five years." She pointed again. "Ursula Grenander was on Mars when I was ten or eleven, then she left and was here a few years. I suppose that's her husband."

"And note Christina and John are talking to both of them. I suspect they're laying the foundation for discussing elections." He pointed to someone else. "That's Klaus Richter, a geologist, and his wife, Barbara Desjardins. I met them at MIT about five years ago; he was giving a lecture about Mercurian volcanism. It was fascinating. They've been here before, too." He looked around. "About half of the arrivals are Europeans in their forties, I'd say. I bet most have been here before."

"This is a hardship post," said Liz. "None of them have families because they're here a few years, then on Earth for a few years to write up their research and teach at a university, then they're back here. If this place grows more and improves, I bet many of them would stay."

"No doubt. Let's talk to Klaus; he'll recognize me, I think." They nodded goodbyes to the Benets and walked over to the other couple, which was talking to Marina

Zinchenko, a Ukrainian engineer, and Paul Pokorny, her Czech husband, who was in charge of Mercury's shuttles. Marina and Paul withdrew hastily when Mike and Liz came over. Klaus looked at them a moment, then smiled. "Yes, you're Mike. . . Mike what, though, I can't remember. From M.I.T."

"Mike Tobin, working on my dissertation about planetary magnetic fields with a focus on Mercury's pole reversals. This is my wife, Liz Elliott."

"The dancer! I've heard you're dancing for us tonight, I can't wait to see. Pleased to meet you. This is my wife, Barbara Desjardins."

"Pleased to meet you," Liz replied. They all exchanged handshakes.

"I hope you had a good flight?" asked Mike.

"Yes," replied Klaus. "The caravel makes it much more comfortable, and with a crowd on board it's sociable as well. The two ITVs were pretty crowded, though."

"And the shuttles," added Barbara. "I can't believe how big this place is, too!"

"It's impressive," agreed Mike.

"I wish our flat didn't smell strongly of fresh paint," said Klaus. "It's small, but adequate. The greenery will really help."

"You should see Gamma," said Mike. "We inflated the dome a bit the other day. It's as big as Alpha and Beta combined and the ceiling's noticeably higher. We'll be able to walk around inside without suits in about two weeks."

"I can't wait," said Barbara. "Setting up its agriculture is my responsibility. We've got some new genetically modified crops for it that can use the brighter light and longer days more efficiently."

"It would seem that new crops are not the only things growing here, though," observed Klaus to her.

Mike nodded. "There's a groundswell of discontent."

"Definitely," replied Klaus. "I've heard from several old friends since the landing and they emailed me during the flight. They're right; we need more democracy here. I just read an article in the *New York Times* about the discussions the Ceres crew are holding to draw up a charter for running their outpost on Ceres. It's fascinating; they're planning to use much of the ten-month flight to finalize the document. And the Saturn mission will do the same."

"We need to get a draft and see what they're proposing," agreed Barbara.

"I'm curious," asked Mike. "Would a more democratic governance encourage people to stay here longer?"

"I think so," said Klaus. "I doubt we'd stay, but who knows? This is our second tour. We stayed four years last time and enjoyed the work, in spite of the conditions."

"Early Mars was that way," said Liz. "A hardship post, little space, almost no greenery. But people stayed even though they had planned to leave and started families when they had never planned to do so because the community life was so close. And that was a function of participation and leadership."

"I doubt we'll manage that here," replied Barbara.

When Will came out of the bathroom, Ethel was already sitting at her desk in their bedroom, scanning the pages of *Mars This Sol*. "Some interesting terrestrial news," she said. Since his election two months earlier she had made it her responsibility to scan

Mars This Sol, *The New York Times*, and the BBC for news relevant to the Chief Minister. “The President of the United States gave a speech at a Baptist convention in Mississippi where he denounced the Grand Union as a dangerous weakening of national sovereignty and a threat to the safety of the United States and said the country would work actively against its continued expansion.”

“He’s feeling the heat from the conservative Democrat candidate for President, who has said he’d reform the United Nations to strengthen it.”

“It’s a strange day when both American parties are in favor of the U.N.; but it’s weaker than the Grand Union. The dollar has tumbled five percent in response to his speech. Do you think the U.S. and China are coordinating their attacks?”

“I bet they are. They have the most to lose if the G.U. keeps spreading. Now that Iran wants to join, there will be a corridor of G.U. territory connecting Europe to South and Southeast Asia. The G.U. will surround China.”

“And with South Africa asking to join in 2071, all of Africa will feel encouraged to make the necessary reforms to apply. Do you think we’ll apply?”

“I don’t know. It’s really complicated.” Will glanced at the clock. It was 7:20. “I’d better take a shower and get going.” He pulled off his clothes and tossed them into the dirty clothes hamper. Ethel admired his body as he walked past her to the bathroom. He couldn’t help but notice; it made him feel less ancient.

He shaved and showered quickly, dried off, and came into the bedroom to dress. Ethel was still at her desk reading her attaché, and she didn’t look happy.

“What is it?”

"An interview with Ramesh Pradhan that was just posted to *Mars This Sol.*" She shook her head. "He carefully didn't refer to you; he referred to 'our government' instead. He mostly complains. He's unhappy the Council approved of people holding Council seats simultaneously with a Cabinet or Supreme Court seat. He's concerned the State of the Commonwealth speech said nothing about urban planning or the size of Aurorae versus the other outposts. He asked what sort of Ranger Corps we were establishing and whether they represented the beginning of a Marsian army and space force. He criticized the quality of several cabinet appointments and expressed hope the Council could improve things."

"It sounds like he took all the complaints he voiced to me after the speech and sharpened them for public consumption, and added a few he voiced to the Council."

"You can't simultaneously complain that quality candidates aren't being offered and that people shouldn't hold two seats in the government. We're not very big."

"Ramesh is self-serving. These are the complaints of an old-style politician."

"What are you going to do?"

"I'll read the interview after my appointments, or maybe between them, and be sure to get my response aired as well. Of course, I won't mention Ramesh; he didn't mention me. I'm grateful for that."

"It's politics!"

"I'm now a politician and a public figure. We're trying to do things differently, but things won't change overnight. Be thankful he's speaking at the level of principle. I'd rather see principles debated than personalities or motivations."

"I suppose."

Will pulled on his clothes, put on a tie, and they headed for the kitchen for coffee, toast, and his pills. Then he walked to the Bahá'í House of Worship, just meters from his house, for five minutes of prayers. They made the daily routine easier to handle.

He got to the office by 8 a.m. He met with Huma and they reviewed the daily schedule. They managed to find an hour when they could meet with Jacaranda to plan a response to Ramesh. Will knew it was important to maintain as high a popularity level as possible; it made legislation easier to pass and policy easier to enforce. That meant leading the public discourse rather than responding to it.

At 8:30 Charles Vickers arrived. Will greeted him at the door. “Thanks for coming. I would have gone to you, but I no longer have time to walk around.”

“That’s okay, I’m glad to come here.”

“Coffee? Tea?”

“Coffee. We have a good supply of marabica on board our ships.”

“Good. Transjovian injection’s three sols away.”

“Just three sols. I blast off for Embarcadero tomorrow at dawn. Everyone’s on board the *George Washington* and the *Pacifica* or is on their way to the ships from Mars and Phobos. The gas-core engines are primed and ready.”

“I’ll be watching the firing closely. Gas-core has a lot of potential for Mars. Make yourself comfortable.” Will pointed to the easy chairs and went to the hutch to pour a coffee and a tea. “You’re on your way with sixty folks?”

Charles was surprised by the question; Will knew all the details. “Yes, two caravels, thirty people each, one U.S. and one Marsian, though the U.S. ship has plenty of

Europeans and South Asians and the Marsian ship has some Americans; even two Chinese."

"I'm sorry to see you and Martha leave again; we'll miss you. Is Caitlin going?"

"No. She applied and was turned down. She's at an in-between age; at 21 she can't go under our authorization because she isn't a minor, but as an adult without even a Bachelor's degree she's not qualified and experienced enough to go on her own. But she'll apply again for the flight four years from now, and they'll give her preference as a family member. We'll probably stay ten or twelve years, then come back here to retire."

"Sounds like my recent plans. I'm really pleased with the joint mission and the follow-up plans; it looks like we'll be maintaining at least sixty people on Callisto from now on, in addition to the Chinese commitment to maintain thirty."

"We'll gradually increase the numbers. After landing we'll convert the *Pacifica* and *George Washington* into rotating housing, so they won't be able to fly back to Mars or Earth because all the floors will be tilted. The conversion will take a year. We'll melt some caves and set up bubbles for underground housing and greenhouses, too."

"It's a shame one seventh gravity is too low for human health long-term. The moon's purchasing some caravels from us for 0.4 gee rotating housing as well, so people can stay there long-term with their families."

"Which raises the issue of settlement of the moon and governance of the community there. Governance is the big question for us as well. We'll use the flight out to discuss a fundamental law, just like Ceres. Of course, the Ceres mission can establish a system for the entire asteroid. We're arriving on a world with a Chinese base, so our legal sphere will be over our base only."

"They're not likely to encourage election of a head of Chinese operations, either. That's what I wanted to talk to you about, Charles. I sense a golden opportunity to change the situation at Callisto and in the entire jovian system. Did you hear that Enlai Tang is becoming head of Chinese operations in Jupiter space?"

"I heard the rumor yestersol. Is it true?"

Will nodded. "Enlai videomailed me about it yestersol. Commander Li has developed non-Hodgkin's Lymphoma, so he's going back to Earth. They're afraid he won't make it home. Enlai will assume command for at least two years."

"That's good news. I can work with him; Li was a pretty tough bargainer."

"I think even the Chinese found him too hard-line. But there's more. The U.S. and the Chinese governments have both been denouncing the Grand Union lately. I think they're working together against it. So maybe there are some new possibilities for cooperation between them. I'll talk to Pete Theodoulos later this sol about a new push to get the U.S. to join the Jupiter Commission. Once you're on your way, you will be in the position to work on cooperation as well. I'd seriously consider establishing your outpost next to Tienan Station."

"We're slated to land at 'Manhattan,' which is about two hundred kilometers from Tienan. It has all the geographic advantages of Tienan and some pretty interesting geology. Officially, the landing site has been chosen scientifically and is not subject to change. In practice it could be changed, but I think it'll be hard."

"I'm letting you know that I plan to throw all our diplomatic effort behind it. As Mars develops a foreign policy, a major principle has to be encouraging the peaceful and cooperative exploration and settlement of space. Space exploration *is* our foreign policy.

It's in Mars's best interest that the solar system is filled with communities; they'll buy and sell with us more easily than with Earth because of our gentler gravity and extensive space experience.

"So it's important to Mars that the situation at Callisto be regularized. You and Enlai are the team to do it. Mars will throw its weight and some of its money behind the effort. If we have to, we'll support the flight of one caravel to Jupiter every two years; that's a billion redback commitment in equipment and several hundred million redbacks per year of support."

"That's pretty generous. Are you sure Mars wants to spend its support that way?"

"Absolutely. The U.S. and China spend five percent of their gross domestic product on defense. I propose to spend five percent of ours on exploration and settlement of other planets. We don't need defense; we have a huge moat of space around us. Defense brings a nation technology and prestige. Prominent membership in the Jupiter, Saturn, Asteroid, and Venus-Mercury Commissions will bring us the same."

"It may pay for itself, since the money is usually steered back into the economies of the contributors through contracts for equipment."

"But this reopens the issue of where the *George Washington* and the *Pacifica* will land and set up a station. Charles, let's work out an arrangement to expand Tienan Station. Let's get the three caravels close enough so they can be connected by pressure tunnels. Let's settle one outpost on Callisto, not two. Mars will argue strongly for that, and the U.S. may relent."

"Why?"

“Because they and China fear the Grand Union and they appear to be working in concert to stop it.”

“Do you have diplomatic contacts telling you that?”

“No, not yet. We’re already approaching some governments about establishing close informal relations, and we’ll need ambassadors resident in the capitals, drinking martinis with other ambassadors and bureaucrats to pick up the latest gossip. But Mars plans to join the Jupiter Commission, regardless of what the U.S. says, and we want one outpost on Callisto, and we don’t care it has a Chinese name.”

“And a Chinese Commander?”

“That, too; right now the commander is a Marsian, after all. Maybe we should alternate American-Marsian and Chinese-Marsian commanders.”

“I wouldn’t mind that. Look, Will, there’s no such thing as an Americo-Marsian in this case. I am in a very awkward position, serving two masters, when they conflict.”

“You think I wasn’t in that position for most of the last thirty years? Fight for what you think is right, persist, ride out the controversy, and do what you have to do in the end. I wanted to meet with you to let you know what I think is right. Two years ago when you were in Washington you had a chance to find out what they thought was right.”

“I did. Okay, now I understand this conversation. I appreciate the chance to hear your position and I agree with a lot of what you say. I’ll open an informal communications channel with Enlai on the flight out and see what we can work out. You work on Washington. I hope by the time I get to Jupiter, my two masters will be in accordance.”

6

Shaping Our Destiny

early Sept. 2066

Everything echoed in Gamma Dome. The seventy-five-meter space was an expanse of bare plastic. Under foot were heavy plastic tarps with a centimeter of foam insulation sprayed on, then another layer of plastic tarps on top of the foam. When Liz stepped on it she could feel it yield slightly under her feet. The walls were a mix of nomex and kevlar with various additives and spray-on coatings. A pile of nickel-steel sheets was stacked in one area, awaiting robots to weld them into a line of regolith-filled boxes that would be placed against the inside wall. Since the nomex was transparent one could look outside to a wall of “sandbags” of regolith three meters high that circled the dome. Beyond the sandbags one could see “the palisade,” a circle of vertical louvers pivoted edgewise to let sunlight in from one side but closed on the opposite side to bounce it toward the floor.

“I stacked that entire stretch of sandbags with the sandbagging machine,” said Mike to Liz, pointing to a section of the wall.

“That’s a lot of bags. No wonder you came home sore every night last week,” replied Liz. “Imagine this place filled with half a meter of sorted regolith and lush with greenery! It’ll be beautiful.”

“And it’s so large. I hope we build more.”

“You mean you hope *someone else* builds more,” corrected Liz.

Mike chuckled in agreement. They headed for a pair of seats in the front row. The residents of Concord were gathering for their monthly staff meeting. It was exciting to

see everyone; Concord now had eighty-nine residents, plus twelve at Caloris, raising the planet's total to an historic 101.

Once the last few people arrived and sat on the folding chairs, Olaf Norlander activated a large screen in front and dialed up the crew at Caloris. They had gathered in their little cafeteria. "Good morning everyone," he said. "It's exciting to see you at this historical event, the first staff meeting on Mercury involving more than one hundred people. This gathering also marks the end of the four-year emergency we've been living through. Gamma's inflated and ready to fill with life. A crew of fifteen, led by Barbara Desjardins, will start tomorrow to cover the floor with a half meter of sifted and washed regolith. The plants will be established starting in November. In six months this place will be verdant. Mercury will have one hectare, 10,000 square meters, of pressurized space, enough to feed as many as 200 in an emergency. We will set up Alpha, Beta, and Gamma to feed 135 and accumulate the surplus, increase the range of plants we raise, including cotton, and create three small park areas where we can enjoy being 'outdoors.' Barbara, any highlights you want to mention?"

Barbara rose. "You covered it pretty well, Olaf. I'll be working with you and Ursula to implement a new interior layout for all three domes. The plan includes a small forest in each of fruit and nut trees. Concord will have a whole new look and feel to it and will be a much more pleasant place to live."

"Thanks," said Olaf, as she sat. "Caloris will undergo some changes in the next two years as well. Patrice, can you summarize?"

Domkowski nodded and rose. "Thanks, Olaf. I'll be on my way to Caloris on September 22, when dayspan ends there and the entire route will be in twilight or

nightspan. The twelve folks there will be back here October 30. During the two-week overlap we'll inflate and bury two new ten-by-twenty cylinders, raising the outpost's capacity from twelve to sixteen. Setting up the cylinders will be the main task of the next 176-day crew rotation. Caloris will also get twenty tonnes of water; the robotic truck will make two runs to supply it. The following rotation starting in March next year will install additional rock excavating equipment, which arrives from Earth via sailer in January. The rotation starting next September will install two more cylinders and the March 2068 rotation will add new gold extraction equipment. That's the planned rhythm for the next three years: a crew rotation will expand Caloris's interior space followed by a rotation that will increase its gold extraction capacity. Concord also gets four additional virtual reality consoles next year, which allow four staff here to run equipment there. We hope to raise gold production from twenty tonnes per year to fifty by 2070. I'll be alternating my time between here and there for the next four years."

Patrice sat. "Question," asked Christina. "How many people will be required to expand gold production to fifty?"

"Sixteen at Caloris and ten at Concord," replied Patrice.

"Are we adding more staff, or taking staff from existing tasks?" she persisted.

Olaf frowned. "That remains to be resolved, but increased efficiency of our operation will help a lot, and we need the extra income. Thanks, Patrice. With the end of emergency conditions we're also instituting a more active exploration plan, with expeditions going out four times a year. The first one leaves in late October, once the equipment returns from Caloris. Christina, will you elaborate?"

"Sure, Olaf." Christina rose. "We're sending out a two-month expedition of twelve in three conestogas and a mobilhab in late October to Sobkou Planitia. Its principal goal is to characterize some volcanic deposits on the eastern boundary; prospectors have found some unusual high-sodium basalts. In January twelve people will travel the Interpolar Trail to South Pole Station for a 176-day residence, which will include magnetic studies. Their return trip next June and July will include several side trips to volcanic features and an exploration of Antoniadi Dorsum. The expedition next April and May is still being outlined."

"Question." Gabor raised his hand. "Any idea when we'll be getting a new mobilhab or conestoga? We need one more of each, especially considering one of our conestogas is now ten years old."

"I've put it on my recommendation list for three years, now," added Christina.

"I think we have a good shot for a new mobilhab next year and a new conestoga the year after," replied Olaf. "Without them, it's difficult to send a geology expedition when we're transporting a crew to Caloris or Australis. With them we could send out two missions at once and still have rescue capacity."

"Olaf, can you give us a report about expansion?" asked Klaus Richter. "Any idea when we'll go to 125 or 150? When we'll start on a Delta Dome? When we can get the new geochemistry lab we've been asking for? Or the supercomputer?"

Olaf raised his hand. "It's too soon to answer those questions. The focus of the last four years has been on recovering from Alpha's depressurization and constructing Beta and Gamma to provide redundancy. Now that phase is complete. The Mars flights have reduced transportation costs between Earth and Mercury five fold. Cargo

transportation costs have dropped by forty percent with Earth and by sixty percent with Mars. Mars wants to join the Venus-Mercury Commission, suggesting there will be more money for us. Things are looking up. Expansion should be on the horizon."

"Why don't we offer a plan, then?" asked Christina. "We can set the agenda."

Olaf stared at her. "No one has asked us and I don't get the impression the national representatives will welcome our input. The move could be counterproductive. Now, let me make a few announcements before we hear two more reports, okay?" He paused to silence the questions with his gaze. "We have three very happy announcements that I think most of you know about. Teresa and Alberto Soares are expecting a baby in April, Brenda and Pierre Benet are also due in April, and Mary and Gabor Horvath are due in May. That's three more families to anchor this place and an important other way to expand the human presence on Mercury. Pierre is staying and thus will be happy to consult with other couples wishing to augment their intended contributions to this place. All around, the situation here is more encouraging and exciting than it has been in a long time. I hope all of you feel it as well; this world of ours is poised to make a breakthrough to a higher level of activity. Well, I shouldn't give my closing speech yet. Teresa, give your report about our space capability."

Teresa Soares, their chief shuttle pilot, rose. "We're getting a fourth shuttle, the *Budh*, named for the planitia. Because the number of arrivals is so much larger, we need to be able to fly three passenger flights simultaneously and retain redundancy. With four shuttles we will also have greater capacity if a caravel flying by Mercury has some sort of emergency. We're getting a second module for Portal Station. A sailer will leave Gateway next month with empty propellant storage tanks, which will increase Portal's

storage capacity to one hundred tonnes of liquid hydrogen and three hundred tonnes of liquid oxygen. Next year we'll get expanded cryogenic propellant manufacture and refrigeration capacity for Concord Spaceport. All this increases our ability to support an enlarged Concord." Teresa sat to applause, though Christina wondered how many personnel it would pull from their science effort.

"Thank you," said Olaf. "Finally, we have an announcement from the Concord Council; Marina?"

Marina Zinchenko rose. "Thanks, Olaf. The Council has figured out how to juggle various schedules and our budget so that Liz Elliott will be an artist in residence half time. The other half of her time is devoted to day care and the elementary school. Liz will organize an artistic event every two months, offer dance lessons, and spend a certain amount of time practicing her own talent so that she can continue to dazzle us with her performances. We're excited about this important addition to our community life."

There was applause. Liz smiled and wondered what had happened to the promise that she would be a full-time artist is residence. "Liz's first performance will be October 15, when she will do a ballet solo for us, and she is planning a performance of extracts from the *Nutcracker Suite* for Christmastime," continued Marina. "Meanwhile, she'll be organizing the Concord Symphony for performances early next year, though she says it'll be more like an octet than a symphony!

"Now, the Council has another announcement; John?"

John Aylmer rose from his seat, much to Olaf's surprise. "I want to remind everyone that Council elections have been set for October 28. We elect three people. In its meeting the other day the Council decided it was time to reconsider the question of

division of powers and the role of the elected council in the life of our community. The Ceres expedition is smaller—69 people, as opposed to our 101—but they're busy drafting a 'Ceres Charter' to govern their community life together after they land on Ceres. Perhaps it's time we did the same. Therefore the Council plans to sponsor a town meeting for Sunday afternoon to discuss the Ceres—"

Olaf interrupted. "Point of order. This is not a task the Council can undertake."

"Who says?" replied Marina. "Our interpretation of our authority is that we can indeed hold a meeting."

"And I say you can't."

"Olaf, you have no right to ban such a meeting!" exclaimed John.

"I'm Commander and can decide what sorts of public meetings can occur."

"No you can't!" exclaimed Marina and John simultaneously. "We can meet right here or in Beta's fallow corn field, for that matter, and you can't stop us," added Marina.

"We've obtained a copy of the draft of the Ceres Charter," added John. "We just put it on the Council's website. Everyone should take a look, it's fascinating."

"Irrelevant," replied Olaf. "Only the national reps can approve a reorganization."

"Maybe we should offer them a plan," replied Marina.

"They aren't interested."

"Maybe it's time they got interested," injected Christina.

"This is getting out of hand," exclaimed Oxana Norlander angrily.

"Then come Sunday and let's talk about the Commander's role dispassionately," replied Christina.

"I forbid this meeting," said Olaf.

"And how will you stop it; throw all of us in jail?" asked John. "We're holding a meeting Sunday at 2, whether you approve or not."

Olaf looked at John, exasperated but temporarily silenced.

The Cabinet's Meeting room was dominated by a very large, oval table of simulated mahogany. Twelve chairs circled it, and they were occupied by the entire Cabinet, which had finally been approved by the Council: Attorney-General Indira Kumar; Minister for External Affairs, Peter Theodoulos; Minister of the Treasury, Yuki Tajima; Minister for Human Services, Simin Sabetian; Minister for Commerce, Henry Smith; Minister for Development, Emily Scoville-Rahmani; Minister of Transportation, Moses Waigwa; Minister for Exploration, Andries Underwood; Minister for Interplanetary Transport, Yevgeny Lescov; and Speaker of the Legislative Council Lal Shankaraman, who was a nonvoting member of the gathering. Huma Mubarak, as Chief of Staff, sat at a small mahogany desk in a corner recording tasks and overseeing the minute taking.

They went around the table to report on the progress of their various tasks. At 2 p.m., Brian Stark knocked on the door, as scheduled. Huma welcomed him in and the entire cabinet rose to greet him.

"Should we call you Colonel Brian or Ambassador Brian?" quipped Will.

"Or just Brian, Chief Minister Will," replied Stark. "I must say, I feel honored to meet all of you as an assemblage. So many of you have sacrificed; Emily has moved to Aurorae after years at Cassini, resigning as Chief Clerk and Legislative Council member; Henry resigned as a corporation president; everyone has had to give up a job as head of something to start something new."

“That’s the way it works,” said Moses Waigwa, formerly in charge of highway building and the airports, whose job hadn’t changed much at all.

“They’re a great group,” said Will. “We’ve had three meetings in ten sols since the Council approved the last two positions. Everyone has hit the ground running.”

“You got the approvals pretty fast,” said Brian. “Within two months of inauguration. And I hear the Legislative Council will consider a budget next month.”

“And some diplomatic appointments,” added Pete.

“Pull up a chair and sit right here next to me,” said Will, pointing to a spot. “We’re anxious to get the formal briefing from you.”

“I’m delighted to offer it.” Brian sat next to Will and opened his attaché. Huma hovered over his shoulder and typed in a few commands to connect the attaché to the huge wall screen so Brian could project images. His first slide went up. “I assume you all read the 120-page proposal, but I’ll review the highlights. Here we have a photograph of our currently functioning gaseous-core nuclear engine on Deimos. It’s a big thirty-tonne piece of equipment five meters in diameter. We inject beads of a plutonium-uranium mix into the spheroidal chamber and as they reach a critical mass they melt, then vaporize to form a dense, ionized gas that is spun into a vortex and retained in the reaction chamber magnetically. Hydrogen gas is injected into the chamber through hundreds of pores in the spherical walls, thereby cooling the walls below their melting point. The hydrogen bubbles up through the dense, spinning gas, reaching an extreme temperature, and is exhausted out of the center of the chamber through an exhaust bell at about 100,000 kilometers per hour or thirty kilometers per second. This is six times faster than hydrogen-oxygen chemical propellant and three times faster than solid-core nuclear

engines. The engine suffers a steady leakage of plutonium-uranium reactant, so beads must be added constantly; the engine plume must not strike humans or their equipment."

He changed slides to a gaseous core engine attached to a galleon. "And here's a slide showing you what I'm here to talk about: two gas-core engines providing fifty tonnes of thrust each attached to a seven-hundred fifty tonne galleon. It could be carrying 650 people from Earth to Mars or 150 people from Mars to Saturn. It has the velocity to complete two round trips between the Earth and Mars per columbiad or a twenty-month flight to Saturn. The engines will fire up to four and half hours. The two engines cost four hundred million redbacks each; they aren't cheap. Running them for ten hours costs another one hundred million redbacks in plutonium-uranium beads, materials, and maintenance. But a galleon costs three billion redbacks and with chemical propulsion can make one round trip between Earth and Mars every columbiad. After ten columbiads it will have carried 6,500 people; the galleon's three billion redback price tag amounts to about a half million redbacks per person, excluding maintenance; when you add maintenance the total cost rises to about 750,000 redbacks per passenger. With gas-core the same galleon can make two round trips per columbiad, and because some trips are quick they can carry a thousand people each. The engines are good for about four trips before they have to be completely rebuilt. Thus the galleon plus gas-core engine yields a per-passenger equipment cost of half a million redbacks per person. Galleon maintenance is much less because life support equipment can be simpler for the shorter trips and maintenance per month of operation is spread over more people, so the total cost per passenger is about 600,000 redbacks. That, in summary, is the advantage: you can get people here faster, with reduced exposure to deep-space radiation; Mars-Earth trips will

be safe for even small children; and each spacecraft can transport three to six times as many people during its design lifetime."

There was a moment of silence as the cabinet considered the very quick presentation. "Launch of migrants into low Earth orbit now costs about 600,000 redbacks," added Yevgeny. "We'd start at low Earth orbit rather than Gateway. So we're talking about a one-way trip of 1.2 million redbacks and a round trip for tourists of maybe 3 million. Tourists could come here, visit a month, and fly back to Earth in three months. Based on tourist demand to the moon, we can project an increase in tourism to several hundred per opposition. Flying essential equipment and materiel for each immigrant—about a tonne, which costs a half million redbacks to purchase on Earth and 800,000 redbacks to transport here by shuttle and solar sailer—adds another 1.3 million redbacks. So the total cost of immigration with the galleon, with or without gas core, should drop to about three million redbacks. A third of what it was a decade ago."

"Wow," exclaimed Emily.

"So, for a budget of twelve billion redbacks per columbiad, we can afford an immigration of 4,000 people," calculated Lal.

"Precisely," said Yevgeny. "And as we grow here an immigration budget of twelve billion per *year* may be possible. That's twenty-six billion per columbiad and can support 9,000 immigrants per columbiad."

Everyone looked at each other in stunned silence. "Obviously, we have to build slowly toward that figure," said Will. "We don't know what so many new Marsians would do. The question right now is, do we want to buy some gaseous core engines and fewer galleons?"

“Gaseous core engines will be completed on Phobos or Deimos out of parts made here and on Earth,” said Brian. “The plutonium-uranium mixture is Mars-made. Two pairs will be assembled next year for the Saturn expedition. The prototype pair we have now are still good for one round trip to Earth before needing a rebuild, so we’ll probably test them next year using a caravel.”

“What are the economics of the engines with a caravel?” asked Yuki.

“Not as good as with galleons because caravels cost twice as much per passenger and the gaseous core engine cost is spread out among fewer passengers,” replied Brian. “Tickets would have to be about twice as much.”

“And what about safety?” asked Simin. “If the engines fail upon arrival, the galleon will shoot right out of the solar system.”

“Yes, the vehicles exceed the solar escape velocity,” agreed Brian. “That’s why the engines come in pairs; if one fails, the other can fire longer. If a fleet of vehicles flies on the same trajectory it may be wise to send along an extra gas-core engine. That raises your costs somewhat, but because backup engines are pushing less mass, they fire for shorter periods and they last longer.”

“Why don’t you summarize the safety testing record?” suggested Yevgeny.

Brian nodded. “We have an aggressive testing program. The first phase concentrated on reliability of the engine, the second phase on duration of firing. We’ve now fired engines twelve hours continually with no problems; we’ve fired our engines for as much as thirty hours before they needed maintenance; we’ve fired one engine as many as fifteen times. The safety systems are extensive and triply redundant. The software is

immensely sophisticated. We're confident in the engine's official rated lifetime of twenty hours of firing, six hours of continuous firing, and eight restarts."

"Does the sales price include development costs?" asked Simin.

Brian chuckled. "Engine development has cost the United States forty billion redbacks, Mars five billion, India one billion, and Brazil half a billion. We doubt we'll sell fifty engines in twenty years. The sales price includes a twenty percent markup above production costs to cover the cost of technical support services and further research and development. The program will continue to get 1 billion redbacks per year from the U.S. and 300 million from Mars."

"Including a Phobos manufacturing facility, if they locate the plant there," added Will. "If they decide to locate the facility on Deimos, the subsidy will be less."

"But the Phobos facility will require a lot of security and a small reservation," added Brian, to which Will nodded.

"Are we sure these engines will be approved for use in Earth orbit?" asked Emily.

"Good question. It depends on how near. The engine exhaust cannot wash satellites, spacecraft, or people because it is radioactive. The engines probably can't be used below geosynchronous altitude because there are too many satellites that could be affected. They can't be used within about five thousand kilometers of Gateway or closer to Mars than Embarcadero. Trans-Mars injection is best performed beyond fifty thousand kilometers from Earth and spacecraft may use their engines to slow while a long way from Mars and use aerobraking to complete Mars orbital injection."

"What's your next phase of work?" asked Lal.

“We’d like to improve performance thirty to sixty percent in ten years—raising the specific impulse from 3,000 seconds to 4,000 or even 5,000—and build a 100 tonne thrust engine. We’ll see whether the funding comes through.”

There was silence in the room. Brian looked at the Cabinet members one by one, then turned to Will. “Thank you very much for inviting me,” he said.

“Thanks for coming and making your case,” replied Will. Then he rose and shook Brian’s hand. Stark stepped out of the room and closed the door.

“I’m still amazed at the implications of this,” said Lal. “We’ve barely reached a thousand migrants per columbiad. This opens up the possibility of ten thousand!”

“Exactly,” said Will, nodding. “Who would have thought that was possible?”

“We’ll need a lot more shuttles,” said Yevgeny. “They’ll need a faster turnaround. Our spaceports will have to increase their launch rate. Even Earth may soon need to invest in more spaceports.”

“But how reliable are the financial figures?” asked Yuki. “I’d worry about that.”

“We need to do more checking, and the twenty percent mark-up he mentioned suggests there may still be room for bargaining over the price,” noted Will.

“I hinted at that issue in a conversation with Brian yestersol,” said Yevgeny. “I mentioned the idea of a discount for large orders. He said nothing.”

“What’s the dispute about Phobos?” asked Emily. “Is it an issue of sovereignty?”

Will nodded. “Yes. If they put the facility of Deimos, it’ll build up a remote place that is being used as a test facility. On Phobos, it provides jobs and grows one of our boroughs. But they want an exclusive reservation of at least several square kilometers.”

“I’d keep the reservation as small as possible,” suggested Indira. “All facilities will be buried anyway; there won’t be anything to see. Security shouldn’t be that complicated.”

“I’d also negotiate the depth of their reserve; Phobos isn’t that deep,” said Lal.

“Should we do this?” asked Will. “One cost Brian didn’t include: if we can’t get migrants to the Martian surface quickly, we’ll have to off load them to a facility on Phobos so that the galleon can fly back to Earth right away. The one-month round trip is a little misleading; the planets are close enough for that for only three or four months, so you can’t linger in orbit.”

“We’re talking about a lot of shuttle flights between Mars and Embarcadero or Phobos in a fairly short period of time,” said Yevgeny. “We’ll need to develop a vehicle able to carry fifty to one hundred passengers instead of twenty-four.”

“A big expense,” agreed Henry Smith.

“What problems are we missing?” asked Will. “What questions do we need to ask?”

“Can we expand our facilities fast enough to accommodate several thousand migrants per columbiad?” asked Emily.

“It’s also one reason we’re privatizing construction, agriculture, and consumer services,” replied Henry. “We need to privatize our spacelift capacity as well. If we need to be able to deorbit ten thousand people in one year, let private industry borrow the money from Earth banks and build the fifty or one hundred passenger shuttles able to do it. Let Marcraft borrow the money and build the shuttles here.”

“They’ll have to,” agreed Will. “These vehicles can’t be launched from Earth; they’re too large. A four-fold expansion of the Hermes shuttle wouldn’t be that expensive anyway. We can already build the fuselage. The larger engines can be imported from Earth.” He looked around. “Let’s record a vote or a consensus about this matter. Does anyone object to the purchase?”

There was silence. “I am not opposed, but I need a little more convincing about the cost figures,” said Yuki. “Otherwise, this is good for us; not only does Mars grow, but a larger fraction of the equipment it needs to grow will come from Mars.”

Others nodded. “Alright,” said Will. “I agree. Let’s ask for better data and bargain about the price. Gaseous core otherwise is a crucial technology. It’s an important shaper of our destiny.”

7.

Charters

late Sept. 2066

Clara Forsyth Langlais stepped out of the elevator carefully into the micro-gravity environment of the *Olber's* hub. The thirty second ascent from the *Olber's* lowest level to its center had caused gravity to wane from 0.4 gees to 0.02 gees. She grabbed several hand rails and made a ninety-degree turn, converting a slowly rotating wall into a floor. Once on the "floor" gravity disappeared entirely; the floor's movement had been an illusion, for in fact the elevator had been part of the rotating section of the ship while the floor was attached to the non-rotating hub. A few steps and she stood next to a pressure hatch. She pushed a button and it opened, revealing a pressurized thirty-meter tunnel that extended to their other ship, the *Piazzi.*

She entered the tunnel, which was mostly made of transparent plastic with four lines of handrails. It was encased in a lattice of metal beams that give it the strength to hold the two ships solidly docked together. It had a closed pressure hatch half way down, so she couldn't see all the way. She immediately passed hatches on the left and right that led into cylinders ten meters in diameter and thirty meters long; zero-gravity gyms where volleyball and hockey were played. The transparent sides above and below the cylinders allowed her to look at the *Olbers* and the *Piazzi* as she passed between them. The two vehicles and the tunnel connecting them formed a dumbbell shaped complex; the torus of space between the caravels was enclosed by a curtain of netting to allow space suit exercises without anyone drifting off into the void. Often people suited up and entered

the torus just to “go outside”; they stood just inside the netting and looked out at the sun, stars, and any planets that happened to be visible.

The noise of children caused her to stop, open the hatch, and peek into the right-hand cylinder. The Ceres expedition’s seven children were at recess. Oskar was chasing a six year old girl round and round, whooping and squealing, their circular race giving them the centrifugal force to gain a foothold on the cylinder’s surface. A few months short of his fifth birthday, he had adjusted slowly to zero gravity. The first few recesses he just stood in the central passage, clinging to the teacher. But once he got the hang of zero-gee—and after vomiting once from the disorientation—he adjusted and came to love the freedom it gave him. Other kids were hitting balls around and chasing them as they bounced back and forth. One of the two teachers present was drifting across the space to rescue a nine year old who had stranded himself motionlessly in the air, unable to make progress back to a surface.

Clara didn’t see Charles, who was just two months short of his thirteenth birthday, but she heard the sounds of two-man hockey in the left-hand cylinder, so she peeked in. Sure enough, he was there with a twelve year old. He waved at her, so she waved back before closing the hatch tightly.

She entered the *Piazzi* and the hatch closed behind her, hiding the tunnel and the children. She turned ninety degrees and stepped onto a rotating surface, made her way to an elevator, and descended to the second story, where the ship’s cafeteria was located. The Ceres Charter Committee—twelve of the fifty adults on board—was meeting.

“ ‘We the people of Ceres, in order to create a community of peace, justice, and prosperity in the heart of the asteroid belt, to advance science and exploration, and to

secure the happiness of future generations, do ordain and establish this charter of the government of Ceres.'" Juliette LaFontaine read it solemnly aloud. "I really don't like the 'science and exploration' clause. That's not something found in the constitutions of nations. They talk about defense or prosperity or happiness, but not science."

"Are we back to the preamble?" asked Clara, sitting.

"No, we were waiting for you," replied Adam Haddad. "We were handling minor matters." He turned to Juliette. "Not that this is minor. I agree, we need to talk about it."

"It does makes us sound more like an outpost than a nation," agreed Rahula Peres.

"But maybe this will be a charter for a small community," replied his wife, Xi-uzhu Peres. "What are the chances Ceres will have thousands of people in a few hundred years? What would be its economic basis?"

"We don't know," replied Rahula. "But should we preclude the possibility in the Charter?"

"I don't read the science and exploration clause as unfit for a large nation," replied Jack Alberghini. "I read it as a new priority for communities; a post-warfare, post-industrial priority of a space-based community."

"Interesting," pondered Adam. There was silence around the table.

"Sorry I'm late," exclaimed Clara. "My replacement day officer was delayed."

"You mean Helmut?" asked Lin Chen, with a smile.

Clara nodded. "He had some messages to handle, so he couldn't get to the bridge on time. But I do have Indira Kumar's reply to our legal question."

"Do tell," said Adam, who was chair.

"It's in writing." Clara opened her attaché and found it. "She apologized for the delay in responding; she's no longer the Asteroid Belt's Mars-resident lawyer, now that she's Attorney General, but they don't have a replacement yet."

"Mars needs to import lawyers!" exclaimed Juliette.

"God save us," replied Clara. "Indira repeated what we already knew: the last expedition made a formal claim to Ceres on behalf of humankind and therefore it's legally under the jurisdiction of the Asteroid Belt Commission. But this is the important addition: that if our Charter makes claims over Ceres, the Commission could recognize all of the Charter *except the part with the claims to territoriality."*

"Ah!" Rahula's eyes lit up. "So, we can write a Charter for the future, laying down broad claims and giving our 'government' broad powers."

"Probably," said Clara. "She didn't comment on the issue of powers, only territoriality."

"We had better number every section and even every sentence very thoroughly, then," suggested Xi-uzhu. "And make sure each one is fairly straightforward."

"That gives us some interesting options," pondered Adam. "The powers of the Chief Minister could be listed, starting with administration of education, health, and the arts, and progressing up to development of Ceres, exploitation of its resources, enforcement of its laws, exploration of nearby objects, representation of the interests of Ceres on Earth, etc."

"Though presumably the Chief Minister couldn't authorize exploration off-Ceres unless the government he or she ran owned a spacecraft," noted Juliette. "That's the distinction, it seems to me. The Commander of the Asteroid Belt Commission's

operations would control the spacecraft of the ABC and could send out a ship and crew with the ABC's permission, but the Chief Minister couldn't order such an expedition using ABC property."

"That's right," agreed Adam. "Though if there were some sort of emergency, I suppose the Chief Minister might be warranted in commandeering ABC equipment. That could get sticky."

"The Charter sets up dozens of potential clashes," noted Juliette. "One way to resolve them would be to state that nothing in the charter supersedes the authority given to the Asteroid Commission by the people of Earth. That way, if the ABC asserts authority over some matter—or even over territoriality—it would supersede our claim."

There was silence as everyone considered the idea. Then Adam shook his head. "No, I'd favor letting the contradictions get worked out in practice."

"In the town meeting everyone asked us to draw up a Charter for an essentially independent nation even though we'll be a small non-independent hamlet," said Lin. "We all have our doubts about the wisdom, but that's what everyone asked us to do."

"If the ABC always appoints the Chief Minister as Commander—or the electorate always elects the Commander as Chief Minister—then we have one individual with very broad powers from two sources. That's the ideal," noted Rahula.

"At least Indira thinks we can make a territorial claim over Ceres as its residents," said Clara. "And it reinforces the desire of the community to define a Chief Minister, Legislative Council, and Judiciary with broad and general powers. Let's convert everything into numbered lists and see what everyone thinks."

Adam looked around the table; heads were nodding. Juliette was hesitant, but didn't object. "Alright, we have a consensus," he said.

Will Elliott, Yevgeny Lescov, and Lisa Kok looked down the long, verdant cylinder dome. It was a standard thirty-five by seventy-five, enclosing a quarter hectare of area. A narrow strip of rice paddy occupied the center of the long space, where the curved floor was lowest; on the right side was soybeans and on the left, sorghum and wheat.

"Does the breather fit alright?" asked Lisa.

"Yes, though they are uncomfortable!" replied Will.

"You probably don't have it adjusted quite right." She leaned over and wiggled the breather helmet a bit. "I doubt that'll help much. If you want to fix the problem we have to go back inside, take it off, and put it back on."

"The trick is getting it snug at the right spot; otherwise it presses pretty hard on your neck," noted Yevgeny.

"No, it's okay," replied Will. "We're in here only a few minutes. What's the pressure?"

"One hundredth of an atmosphere of CO_2, two hundredths of oxygen, one hundredth of nitrogen, and whatever humidity there is, which is a function of temperature. Right now it's twenty-six centigrade in here, so that means another three hundredths of an atmosphere of H_2O."

"So altogether, seven hundredths; about eight times Martian pressure."

"You'd suffocate in a minute or two, though at least your blood wouldn't boil. Four hundredths of an atmosphere of dry air is the minimum we can use because the

boiling point of water at that pressure is thirty centigrade. Since there's always some water vapor in here, the boiling point right now is 40 Centigrade. Any lower and plants dry out and die."

"I'm amazed they've adapted as well as they have." He reached down and touched the leaf of a corn plant. It looked bright green and healthy.

"Five years of genetic modification, starting with the soybeans, because they occupy almost a third of our farmland. The first trials resulted in wilted plants and yields less than ten percent of normal. We devoted twenty-five personnel and several enclosures that together were almost as big as this place, with varying levels of air pressure. Meanwhile, genetic modification on Earth has raised soybean production per hectare by fifteen percent. We'll be getting seed with the new mix next year and we'll incorporate those genes into these soybeans as well."

"Flavor?" asked Yevgeny.

"All these crops have normal taste."

They walked along the edge of the rice paddy. "Can you raise fish in the water?" asked Will.

"No, the pressure's too low, especially the oxygen. But we can pump the water into a tank with higher air pressure and keep the fish there. By constantly circulating the water the fish will get the nutrients that are in this water and the waste products will end up in the paddy."

"Extracting the oxygen for breathing will be complicated," noted Yevgeny.

Lisa shrugged. "It requires some equipment; it's not that expensive."

"So, how much of our farmland is effected by this development?" asked Will.

Lisa laughed. “These four crops occupy eighty percent of our farmland! We now have almost a square kilometer of Mars under plastic and a quarter of that is built up; sixty percent is farmland and fifteen percent is bioarchive. It’s all pressurized to Marsian standard pressure, three tenths of an atmosphere. Eighty percent of the farmland can be converted to built space; it’s equal to twice our current built space. Low-pressure farmland can be made at about a quarter the cost of high-pressure farmland, so the cost of food should drop. Sales of the farmland to construction outfits will exceed the cost of making new farmland. The profit, Will, is something I want to talk to you about. We don’t want to lose governmental support for biological research and bioarchive.”

“I agree. You need to put some of the profit into endowments for Bioarchive, Inc., and some into the cash reserve for Agmar, Inc. Divide the profit up. Those are decisions the Agmar Board should make. What will enhanced photosynthesis crops do to the quantity of farmland we need?”

“Enhanced photosynthesis?’ asked Yevgeny, unfamiliar with the term.

“Yes,” said Lisa. “The research on Earth goes back thirty or so years: they’re raising the efficiency of photosynthesis various ways, first by putting the genes of fast-growing shade plants into sun-loving varieties, then tackling the various chemical bottlenecks that lowers the efficiency of the photosynthetic process. There are experimental plants on Earth with triple the photosynthetic efficiency. They’ve been trying to figure out how to make temperate climate crops mature only a little faster, but yield two or three times as much, and they’re making good progress. What we need is different up here: we need plants that mature and yield at a normal pace during the dust storm season when insolation is a third to a quarter normal. The Asteroid Belt

Commission first funded that research almost a decade ago because they wanted crops that would grow on Ceres. Success was mixed. The Jupiter and Saturn projects have funded research to reduce the cost of artificial illumination; there's no hope of growing crops on Callisto using natural sunlight, and Saturn's moons are even darker. We're now so large we can fund our own research. This coming dust storm season we'll be planting enhanced photosynthesis wheat and rice, and I think crop yields will stay high. But we haven't inserted those genes into low-pressure varieties yet. There are some chemical incompatibilities having to do with water and gas availability at low pressures when the cells are trying to capture the light more efficiently. I think one can predict that enhanced photosynthesis low pressure crops are six to ten years away. But they're coming."

"What will low pressure agriculture do to commercial farming?" asked Yevgeny.

"They'll have to adjust," replied Will. "They'll sell their existing farmland to developers and use the cash to purchase larger low-pressure fields."

"The big loser will be Aram," noted Lisa. "They have a vision of greening the entire planet one dome at a time, and they want to green Mars at pressures where humans can breathe. That ideal won't make them money any more."

"How big are the proposed low-pressure domes?" asked Will.

"We'll be able to make enclosures three hundred meters wide," she replied. "We're proposing domes four hundred meters long, enclosing 12 hectares at once. They'll soar very high; 150 meters. Each one can feed 1,500 people. They'll allow farming on a scale we've never seen, which will increase our efficiency even more."

"Bees?" asked Yevgeny.

Lisa shook her head. “Not enough air or oxygen for them, for many insects, and for some kinds of worms. Low-pressure enclosures will work only for wind-pollinated crops, and we’ll need to install special fans to keep the pollen moving in the thin air. We also have to use special composting processes to maintain the soil.”

“Something else Aram will object to,” said Will. “Raising food in ‘dead’ soil.”

Lisa chuckled. “People won’t be happy when farmland become off limits unless you wear a breather. But our outposts have plenty of pressurized space.”

“Especially once Baltic South Park opens in a few months,” said Will. He walked along the edge of the rice paddy, looking into the murky water, contemplating the algae growing there and the need to harvest them with fish as well. The others followed. They reached the far end, turned around, and walked back on the other side of the paddy, admiring the sorghum, which was grown for animal fodder and sugar.

“Boy, this place makes you fart a lot,” complained Yevgeny.

Lisa laughed. “Be careful! Both your bowels and your bladder have higher gas pressures than the outside! Most of the workers wear watertight undergarments!”

Both Will and Yevgeny chuckled at that thought. “So, Lisa, how has the transition in administrative structure gone?” asked Will, changing the subject.

She didn’t say anything for a moment. “Agmar, Inc. is now a well organized and efficiently functioning private agricultural company. Bioarchive, Inc. is a well organized and efficiently functioning public company. And Martech’s agricultural research programs are thriving. The transition took six months. But the problems are exactly what I predicted: separating these three activities has severed the cross-fertilization that once occurred and triggered an exodus from Agmar, which is staffed by junior-level people.”

"All three can still swap staff. You've got to figure out how to do it; one reason farming was privatized is because now the research center and Bioarchive are free to work with other commercial farmers. Before, Agmar had an unfair advantage over them."

"I know, it is fairer to commercial farmers to make the agricultural research center independent. There are already small collaborative projects with Kristoff Langlais and the Zen monastery. The research center has several large collaborations with Agmar. But it just isn't the same."

"You'll adjust," said Yevgeny. "Construction's still recovering from its dissection into Marcraft, Mariner Fabrication, and Marbuild. But we're beginning to see benefits from the split. If the Construction Department were still intact it would employ 1,500 people; almost half our entire workforce. By splitting them, Marcraft and Marbuild can buy from other suppliers. Deseret Construction has started to fabricate nickel-steel beams and cylinders and Marbuild's buying from them. So Fabrication's responding by improving its efficiency."

"I know, I understand the economics. We have to keep improving our efficiency. And employment regulation makes it possible for workers to rotate among different employees, gaining experience and relieving boredom. . . but I will miss the educational diversity we had before. Now, newly arrived agricultural workers rarely interact with ecologists or biologists except by taking courses from them at Martech. Fewer agricultural specialists dream of moving from Agmar to Bioarchive or to get PhDs in ecology or plant genetics. They just plan to work for Agmar a few years, borrow money, and become commercial farmers. Agmar's breeding its own competition."

“I’m sorry, Lisa,” said Will. “I understand what you’re saying. But once upon a time there were fifty of us on this entire planet and we swapped all sorts of jobs, from physician and administrator to janitor and equipment repair specialist. Those sols are gone, too, and they’re never coming back.”

“I know, and thank God we’re growing. I never thought I’d see five thousand human beings here; I couldn’t have imagined we’d have tens of thousands of Marsians in this century. But I guess I’m nostalgic for the good old sols; what can I say?”

Marshall dashed home as quickly as he could, a complete hot dinner for four in his two-wheeled shopping cart. He had been too busy to order everything ahead of time, so on-time robotic delivery was impossible. It made his mood a bit foul. The chilly autumnal conditions in Columbia Dome, where they lived, didn’t help.

Amy was already home, straightening out the living room. “Thank God the cleaner was here earlier,” she said to him as he stepped in. “At least it picked everything up off the floor and stacked it neatly on the couch.”

“Now we just have to move it somewhere.”

“I’ll stack it neatly on our bed.”

“And then tonight, stack it neatly on the bedroom floor?”

“I hope not. Did you get everything?”

“Yes, the cafeteria had some good choices. I’ll set the table.” He pulled the food out of the carrier and put the containers in the middle, then grabbed plates, glasses, and cutlery. “Did you finish your computer run?”

"No," Amy replied, as she walked into the bedroom with a pile of dirty clothes. She continued from the other room "But the heat flow calculations don't look good for a Titan greenhouse. It'd have to be heated extensively if the wind is blowing."

"Even if we set it up in a thermal area?"

"Yes, in Titan's thermal areas the ground isn't that warm." She walked back into the living room. "I put the laundry in the basket so I can drop it off tomorrow. How was your work?"

"Interesting but slow. God, there's always something new to spot! It's a damn big world. Just yestersol we identified a new thermal complex in southern Xanadu."

"Really?" Amy grabbed the last pile and hauled it into the bedroom while he finished setting the table. Marshall turned to messages. One was from Liz.

"Liz videomailed us. Mom and dad aren't coming for ten minutes, so I'll play it."

"Okay. This place looks half decent now, and I see the table's ready."

Marshall nodded and pushed the icon to activate his sister's message. Her face appeared on the screen. "Hey, Marshall! Just thought I'd give you a holler before going off to work. I see the mission's selected six potential landing sites on Titan and three each on Enceladus, Tethys, and Rhea. I envy you guys; you're involved in an incredible project. That new rover on Enceladus is sending back awesome pictures of the cryovolcanoes and the ring explorer has been doing fascinating science.

"Not much new here. I have a bit more time for the arts, but everyone wants me to do about twice as much as I can. They don't appreciate how much practice a good dance routine takes. I'm starting dance classes for four of the older kids next week, so that's a whole new endeavor. Mike's immersed in his paleomagnetism work; there's a volcanic

sample just recovered from the southern igneous field that suggests an era when the planet had a strong magnetic field, but the sample hasn't been dated yet. So we're busy and doing fine. Hope you and Amy are well, give me a call, bye."

Marshall had to smile at his sister's rapid closing. No doubt she was in a hurry. The message had arrived several hours ago; it was now close to lunchtime at Concord. He hit reply. "Hi sis. We're fine. Not much new here either. Amy's working on the design for the Titan greenhouse, which is much bigger than the models we were testing at the Martian north pole, and of course there are all sorts of problems. Nothing we can't overcome, though. And I've been busy on the thermal complex study team; Titan's got lots of cryovolcanoes and hot water releases. They're the key to both heat and power on the surface. We're sending several steam turbines to supplement the nukes. Otherwise, not much new. Dad got roasted a bit by the Council this morning; you can follow it in *Mars This Sol.* The politics of the Saturn mission are really quiet, but I suppose they'll pick up next year when the rest of the crew arrives from Earth. We're all in email contact and there is discussion of a Charter going on, but since we all haven't met, personality clashes are minimized! That's different from the situation on Mercury, eh?

"Good to hear from you. Bye." He hit send.

He rose to help Amy with the drinks but there was a knock on the door. He walked over to let his parents in. "How are you?" he asked them as they came in.

"Pretty good, dear," Ethel, kissing him.

"Me, too; how are both of you?" asked Will.

"Fine. Boy, that interchange in the Legislative Council was fierce this morning!"

Will shrugged. “It’s to be expected. When I was elected, I knew that there were ten or twelve people who really did not want me as Chief Minister, mostly because of decisions I made about independence. So there is a core of people who are very concerned about what I do and why, and they ask tough questions.”

“But Ramesh is the worst, and he isn’t opposed to you because of your views about independence. He agreed with them,” said Ethel, raising her voice.

“I know, he’s doing his thing,” replied Will.

“At least it looks like they’ll pass the budget,” said Marshall.

“With a few modifications. The article in *Mars This Sol* struck me as a good description of the situation. We’re having the entire Council over for tea on Satursol; I hope that’ll help smooth over some differences. I’m glad they invited me for a debate about governmental policies. I may do it every month or two.”

“That often?” said Ethel, surprised.

“Yes, if people vent in public, they’re more willing to compromise in private.”

“They feel you’re listening,” said Amy.

“Exactly. There are always a few people who will oppose you regardless how much you listen and try to accommodate, but at least you can peel off their more reasonable allies!” exclaimed Will.

“The teas and other informal gatherings help keep everyone talking to each other,” added Ethel. “The Council is polarizing into more capitalist and more socialist tendencies, and into groups more concerned with the moral tone of our society versus those who are more hands-off morally.”

“But no overt political parties, thank God,” added Will. “Not yet.”

"How's your work, mom?" asked Marshall.

Ethel sighed. "Lots of planning right now for 2067-69. There's a big debate on the moon whether to raise platinum output at Parenago further, and if they decide to do so we would probably have to do the same, which means a lot of expense to increase production. Higher production would cause lower sales prices, so our income would barely increase! The moon can import workers any time; we can't. And now that we're approaching the middle of the columbiad we have the usual crowd of workers trying to change jobs and get higher salaries, so there are a lot of human resources challenges."

"It's the worst part of being a boss," agreed Will. "When people get tired of their jobs, only rarely can you assign them to something new. They have to wait until a shipload of new workers arrive to take the bottom-of-the-barrel jobs."

"Let's sit and eat," suggested Amy. She led them to the table, where the meal was already set up. Just then, the videophone beeped with an incoming message.

"It's Liz again," said Marshall.

"How nice; we can all call her together," said Ethel.

"Yes," agreed Marshall. He hit play.

"Hey Marshall, thanks for the reply. I just got a break from watching kids and saw your message pop into my in-box. To say Saturn is a political contrast with Mercury is the understatement of the solar system. As you probably heard, the Concord Council, which really doesn't do much—oversee the child education and arts—has decided to draft a Mercury Charter, patterned after the Ceres Charter. Olaf is totally opposed to the effort and emphasizes that it is totally illegitimate, but last week when the Council called a meeting in the lunch room to discuss the draft, fifty-five people attended. Most of them

supported the idea of sending the Charter to the Commission for its consideration. There's really a strange sort of revolt happening here. People feel oppressed because of the emergency conditions and the very hard work and long hours, even though the situation's now over. They feel ignored and complain Olaf doesn't tell them what the future plans for Mercury are, and that he doesn't press for a bigger voice in the planning process. Maybe half of the new arrivals have been here before. It's the first time that the majority of the people who rotate through the Mercury facilities are here at the same time. There's a real sense that now Mercury is big enough for one to stay and maybe even start a family, and of course Dr. Benet is unexpectedly stuck here and can give people fertility advice. So there's a real ferment that it's now time to do something—anything—differently. Mike's caught up in it, too; he agrees the place needs a shake-up, and his boss, Christina, is one of the change-leaders. So I'm getting worried; no one wants to live and work in an outpost split into two warring parties. The cafeteria is tense enough already. Say some prayers for us 'down' here; we could use them. Bye."

Marshall leaned over and pushed the off icon. "That doesn't sound good," he said.

"No," agreed Will, thinking. "The situation sounds quite serious."

"Why doesn't David do something?" asked Ethel. "He must know."

Will didn't reply right away. "I think David's options are limited to videomailing to Olaf and the others, and that may not be effective."

"But it could help," said Ethel. "He could also talk to the national representatives and push some new thinking."

“Confidentially, David plans to retire by the end of the year, but he hasn’t announced it yet so that the national representatives can find a replacement. As a result he’s something of a lame duck. He can’t do too much.”

“Terrible timing,” said Ethel, shaking her head.

“Amina’s cancer is terminal. She’s got maybe six months left. He wants to spend as much time with her as he can.”

“Oh, no. She’s such a great person; very kind, hospitable, always friendly,” said Marshall, very saddened by the news.

“She really is,” agreed Will. “David really can’t do much for the Venus-Mercury Commission right now. And it sounds like Olaf may get voted out of his position.”

“But they can’t do that,” said Amy.

“No, but if a majority of the residents don’t want him any more, what can Olaf or the Commission do? He’ll have to resign. And then he’ll be stuck on Mercury; he can’t leave for twenty-two months, and even then he has a wife and two kids to take care of.”

“And he must have some supporters who will be disgruntled. Sounds like it could get sticky,” said Marshall, shaking his head.

8

Votes

Late Oct. 2066

The entire membership of the Legislative Council looked worn out from two sols of deliberation. The chronometer on the wall was flashing 16:05 and their stomachs knew it was getting late; they hadn't had a break since 1 p.m. Lal sat in his chair up front, trying to look attentive. Tatiana Gavrilova, a representative from Dawes and the Council's new Clerk—Emily Scoville Rahmani having resigned from the Council when she accepted a position in the Cabinet—was finishing up her comments in favor of Ramesh Pradhan's amendment. She sat and Lal rose.

"The round of comments about the amendment are nearly at an end," he said. "Of the forty-nine members of the Council, forty-one have spoken and the result has been a very useful debate. Chief Minister Elliott has asked to speak, and then I will offer the floor to Ramesh for one last defense of his proposal. Then we will vote. Will."

Will rose from his seat in the second row; he still sat where he had been assigned at the beginning of the term. "I want to thank my esteemed colleagues for a discussion that has brought to light many valuable perspectives and principles. As a deliberative body and as a society we are learning how to work our way through some complex and difficult issues. It bodes well for the future of this world, regardless of the result.

"We are seeking to determine what form of representation in our government is fair and just. A decade ago we decided that because tens of thousands of individuals and corporations had invested in Mars and that there were only hundreds of humans residing

on the Red Planet, it was most fair to form consultative organs for both residents and property owners. Our situation was unique, so our governing principles reflected it. The voters, in ratifying our new Constitution, clearly disliked the result and questioned the continued relevance of the principle of property. Polling and focus groups conducted by *Mars This Sol* have shown that the main objection was the extension of the franchise to corporations, to non-individuals. Hence my proposed constitutional amendment bases election of the Mars Assembly solely on individual property ownership, regardless of the size of the holding. As has been pointed out in our deliberations, this change safeguards our system from the potential abuse of a large corporation splitting its land holding into thousands of subunits, each owned by a different subsidiary, in order to garner to itself thousands of votes. In spite of corporate opposition, support for this change is strong.

"But Ramesh's amendment to this constitutional amendment would go farther and strip the franchise from all non-residents who own land. Is this necessary or fair? What is the abuse we are countering? Seventy thousand human beings are so excited by the development of this world that they have personally invested in its land. They represent a vast diversity of people, living in virtually every nation on Earth. They are ambassadors of the Marsian experiment in almost every society and culture. Among the seventy thousand landowners are virtually all of our adult residents as well, and only a resident landowner can be elected to a body that meets on Mars. The Assembly only has the privilege of approving changes to taxation of land and expenditures of the same. This year there were no changes in land taxation to approve and the expenditure amounted to one percent of our budget. It was allocated to road building and other capital improvements that benefit everyone. What harm is there in giving land owners the

privilege of approving the taxation rate they pay and the disposition of the money collected from them? Is there any evidence they will be engaged in legislative mischief? Can we not anticipate the day when there will be millions of Marsian land owners, and the majority will reside on this world?

"In short, this constitutional amendment creates a broadened franchise, it opens our experiment up to millions who potentially could participate, it raises interest and excitement in Mars among the terrestrial masses, yet it rightly limits their role and privileges the role of persons residing on Mars. Why should we turn our backs on so many of our friends; worse, why should we strip them of a privilege already granted them? What about the venerable principle 'no taxation without representation'? Let us amend our Constitution so as to broaden the Marsian experiment in a sensible, inclusive, and empowering way." He sat to a chorus of support and scattered applause.

Lal nodded to Ramesh, who rose from his seat. "It's late, so I'll be brief. I have every reason to agree with the Chief Minister: I am the chief executive officer of a corporation, a land owner, and I was a land owner for five years before migrating to Mars. Yet I nevertheless respectfully disagree with him. We were generous with privileges back in the days when Mars was not sovereign and when we were miniscule in number. But now we are thousands rather than hundreds and the day when we are tens of thousands is at hand. We are a community with national sovereignty. Privileges must be carefully considered and our constitutional principles deliberately selected. Should Mars have one legislative body, or two? Many nations have two, but if so, what are they based on? Is the privilege of property ownership ever a criterion? Not any more; it was swept away by revolutions, usually more than a century ago, and is considered an outmoded

principle on which to base the electoral franchise. Yes, our situation is different; yes, we have seventy thousand individual investors in the Marsian experiment to consider. But is it necessary to confer a voting privilege on them? Can they not form a nonprofit association? Probably every one of us in this chamber is a land owner already; can they not approach us, their fellow land owners, if they have a grievance or a suggestion? The slogan ‘no taxation without representation’ is a nice one, but it is rarely operationalized on Earth. A person who owns property in two cities only has the privilege of voting in one of them and has no say over his taxes in the other, because it is assumed that most of the residents are taxpayers and thus will guard non-resident taxpayers’ interests.

“We have talked about the danger of corporate abuse, but what if an organization wishes to influence us by encouraging thousands of members to buy land here? It has been stressed that we have zoning laws that maintain minimum property sizes, but what if a loophole is found? An organization could encourage tens of thousands of members to buy tiny plots of land here to, for example, oppose our use of nuclear power by blocking part of our budget.

“Mars is indeed debating fundamental constitutional principles. Let us not enshrine property as a fundamental principle in our governance. We only need one legislative chamber based on residency and the age of maturity. Let us abolish the Mars Assembly entirely.”

Ramesh sat to applause and murmurs of support. Lal rose and looked around at everyone, who grew quiet. “Do we have any further discussion about the amendment?” There was none. Will looked around, wondering how the vote would go. His informal count showed that it was close. He glanced at Ramesh, who looked nervous.

“Very well,” said Lal, turning to the administrative assistants seated by the side. “Let us run the voting software and see what we get.”

A moment later the display screen high on the front wall, which had been displaying a large three-dimensional view of the escarpment, turned white, then was replaced by a list of the names of all the Council members. As soon as it appeared, the representatives began to push a button on the screen in front of them to vote yes or no, and as soon as they did a Y or an N appeared after their names. The tally quickly mounted in the lower right corner in gray. Then it turned black; everyone had voted. “There we have it,” said Lal. The yes vote is 22 and the no vote is 27. The amendment to abolish the Mars Assembly is defeated.”

Liz looked across the cafeteria. Olaf was glaring angrily at Christina throughout her speech; she pretended he didn’t exist. Mike shifted uncomfortably in his chair; the tension in the room was palpable.

“She’s running for Concord Council solely based on her work on the Charter,” whispered Liz, once Christina finished and sat to scattered applause.

“Of course,” Mike whispered back. “That’s what she’s known for.”

“But the Council can’t implement the Charter.”

“If we elect the right people, they may very well try.”

Liz considered the implications of that: revolt. “But what’s the point? There are only a hundred of us here.”

“Yes, but we’re the hundred human beings who are the experts about this place, so we have leverage.”

She looked at the floor, very uncomfortable.

The next candidate for the three-person Council was Oxana Norlander, and she was introduced. She rose and defended her husband, accused the attackers of being unfair, and denounced the effort to create a Charter for self-government. “Well, we know why you’re running,” said Christina rather loudly when she sat.

“That comment is out of order,” quickly exclaimed Patrice Domkowski, who was serving as moderator for the evening. Someone hissed; either against his statement or Christina’s comment, it wasn’t clear. He glared at the heckler and introduced Gabor Horvath, who was the last of the nine candidates running for the Council. Gabor stood and talked about the expansion to one hundred, the improved children’s educational efforts and the arts, and proposed some future projects. It was a thoroughly practical presentation that ignored the current controversy. Several people yawned.

“Okay,” said Patrice. “That’s two hours of statements from candidates. Thank you, everyone. I hope you’ve had enough time to think about who you will vote for, because I propose that we not prolong this meeting. We have real paper ballots, which I will distribute, unless someone wants more time to discuss something.”

No one objected, so Patrice passed out the ballots. Two tellers sat at the collection table and checked an optical scanner while others, sometimes chatting or even joking, began to circle the names of the three they wanted to vote for. Liz tried to close out the noise and focus. Fortunately, Patrice rose and called for silence. The room quieted and she said a quick prayer, as Bahá'ís were accustomed to do. Then she voted for the two moderates among the candidates and wrote in a third name, even though she knew the write-in had no chance. She could not vote for either of the two sides.

When she rose to turn in her vote, there was already a line. They all stood in the slowly moving clue very seriously. The tellers checked off the name of the voter, ran the ballot through the scanner, and put it on a pile. Her ballot made the scanner beep; it couldn't handle a hand-written name, so they had to tally it by hand.

After she voted, she sat in her seat next to Mike, who was almost vibrating with anticipation. He glanced at Christiana periodically, hoping her side would win. Christina looked very serious, almost worried. Olaf sat stone-faced.

There was a stirring at the tellers' table. They took the pile of ballots and tapped it on the table to make it neater. They consulted their notes, then called Patrice over, who nodded. He took the results to the front of the room. "Of the ninety-one adults on Mercury, ninety voted," he began. "The Council consists of: Marina Zinchenko, with sixty-nine votes, John Aylmer fifty-two, and Christina Andropoulos, thirty-nine. The alternate members are Gabor Horvath with thirty-five and Oxana Norlander with twenty-one."

"Wow!" said Mike, impressed by the sweep of the "Charter" candidates. Oxana looked shocked; Olaf, angry. "I hope we plan to recount them, just to be sure," he said.

"I'll count them personally," replied Patrice, a bit surprised by the strength of the "charter" sentiment. "We'll respect the vote, I'm sure."

"Of course," replied Olaf.

Marina rose. "I want to thank everyone for participating in this process, which is important for the future of this world. You can be sure that the Council will take the election as a vote of confidence in its plans." She left it at that.

Everyone rose to leave the cafeteria. “I know your concerned, but don’t worry,” Mike said to Liz. “This is for the best. The Council has popular support behind it, so it can start presenting ideas to the Commission directly. The Commission will have to listen. Two of the three new members were supported by more than half the voters and the third came pretty close.”

“I suppose,” said Liz. She looked around; people were whispering to each other or speaking in low tones. “But the process has made us so distrustful of each other, we have to whisper. That can’t be good.”

Will hurried down the hallway from his office to the meeting room next door. Inside, Yuki Tajima, the Minister of the Treasury, and Henry Smith, Minister of Commerce, awaited him. Will was always pleased to see Yuki because she was pleasant and professional; at 34, she was the youngest cabinet officer, having arrived on Mars during Columbus 11 to serve as Chief Financial Officer for the Commission’s Mars operations. Henry, age 40, was one of the other younger members. He could be quite acerbic.

“Good sol,” said Will. “Have we seen Pete yet?”

“He stuck his head in a minute ago and apologized he had to respond to a call, then he’d be back,” said Yuki. “That was quite a dramatic vote in the Residents Council the other sol, Will.”

“Yes, it was. The debate was tedious, but it brought out some very good points, pro and con. I talked to Ramesh afterward and he said that he was not planning to contest the amendment when it moves into the public vote phase. The Council members are lining up behind it.”

"That makes sense," said Henry. "If they defeat the amendment, we continue with the current system, which is worse from their point of view."

"So, we will continue with one and a half legislative chambers," concluded Yuki.

"Yes, though that phrase from *Mars This Sol* is not the fairest description," replied Will. "The Mars Assembly will have a much smaller sphere of responsibility than the Mars Council, but will remain a part of the legislative branch. I think this is a good compromise. For decades we'll have a large number of terrestrial residents who own Marsian land. It strengthens us to give them a role in governance, but we make their role commensurate with their financial contribution. The Chief Minister can decide whether to allocate their tax money to one governmental department or split it up among all the departments, thereby deciding how much of the budget they can debate."

"I worry about the inevitable presence of campaigning and lobbying among them," said Yuki. "We have much less control over what is said by and to the terrestrial residents on Earth than we have over the media here."

"I'm not so worried about that," replied Will. "Corporations already buy advertisements on *Mars This Sol* and other Mars-oriented media outlets to influence policy here. The Mars Assembly is not the Council and will function differently. They will probably debate all sorts of non-binding resolutions and will be an outlet for public debate over various issues. They will be more colorful; that will make the Council look more calm and deliberative."

"Did Ramesh say anything to you about his other amendment?" asked Henry.

"You mean the amendment giving the electorate the right to elect the Chief Minister directly? No, we didn't talk about it. It went down in flames pretty fast; I was

surprised the Council was so opposed to it. I think the current system is better because it focuses on elections of representatives in small, local districts where one can have face-to-face relations with the possible choices. We need to preserve the element of personal familiarity as much as possible."

Just then Pete Theodoulos popped into the room. Aged 67, two years older than Will, Pete was the oldest member of the cabinet, and had a shock of white hair on his head to prove it. "Sorry," he exclaimed. "A call from Japan, and it's almost 5 p.m. there on Friday, so I figured I should answer it quickly." He sat at the table.

"Ministry of Foreign Relations?" asked Will.

Pete nodded. "Yes, they want us to establish an embassy in Tokyo, or at least a consulate. The trade relationship's pretty strong."

"All these consulates and embassies are going to be very expensive," commented Will. "Anyway, we are here to resolve, if possible, the question of joining the Grand Union and retiring the redback. In the last few weeks, the number of nations wanting to join the Grand Union has swelled to a flood: most of the Arab world; Sri Lanka, Nepal, and Bangladesh; New Zealand; all of Southeast Asia now wants membership except Laos; and most of the small Pacific island nations are applying. Pretty soon the Grand Union will include everyone except the United States, China, and a few rogue states or basket-case states in Asia and Africa."

"A lot of them have a long way to go to reform their governing structures," commented Pete. "It'll be a decade or two before they're full members. But increasingly it looks like the U.S. and China will have to drop their opposition and join as well. The debate in the U.S. is already pretty fierce."

"You can say that again," agreed Henry. "But I agree with your assessment; the U.S. will probably have to join, in spite of the clear restrictions on national sovereignty that membership requires and in spite of the fact that it means the European diplomatic approach to the world has won the day. The American business community is beginning to feel the limitations of the dollar. It's no longer the de facto world currency and it'll never get that role back. The rest of the world is too stable and united now."

"That gets us into the argument, then," said Will. "The other sol I got a videomail from the President of the International Manhattan Bank—third largest bank in the U.S. and sixth largest on Earth—urging me to move Mars into the Grand Union. He stressed the positive benefits to Mars flowing from replacement of the redback with the geo: a stable currency, no currency exchange issues, no exchange-rate fluctuations, etc. I still haven't replied."

"Long-term, he's right; there's no question," replied Pete. "Joining the Grand Union will put us inside a huge system of laws and policies that will govern most of humanity by the late seventies. Joining the geo will mean predictability and stability of prices. And we won't have to abolish the redback altogether; their policy is for the joining state to increase or decrease the value of their currency a certain amount until it can be locked in at an even fraction of a geo. Then the currency continues to appear, in a sense; in South America bills circulate that say ten latineros on one side and five geos on the other."

"And they can be used in Europe in place of five euro/ five geo bills," said Yuki, nodding. "It's clever. But we need to consider the short term implications more, Pete. We won't have any control over the redback's value; the currency reserve bank in Geneva

will decide how many are in circulation. I have fundamental objections to that on economic, not nationalistic grounds. It's one thing to integrate the Latin American, Japanese, Indian, and European economies; it's a vastly complex problem, but it is possible because barges and trucks can move goods around the Earth in a matter of days or weeks, and people can move from place to place in a matter of hours. But we can't get people and goods here in less than a month even with gaseous core engines; right now the travel time is at least several months, and with solar sailers cargo takes a year. Even then, the cost of moving goods between the planets is about five thousand times higher than between the continents. We don't need to impose import tariffs; the cost of transportation is a huge barrier. Our industries have strong import protection and a lower barrier against exports because of Mars's relatively gentle gravity well. As a result, we can never be integrated into the economy of the Grand Union in any meaningful sense."

"True, but joining confers other benefits because we'd be insiders," replied Pete. "The Grand Union is a huge trading system. Nations have to meet certain criteria in terms of transparency of the judicial system and the fairness of their elections, and they have to adopt certain regulations, but overall they have a lot more sovereignty than the members of the European Union. We would not have any problems meeting their legal and governmental standards. We wrote a lot of them into the Constitution."

"What about environmental and employment standards, though?" asked Will. "Most of the environmental regulations would be utterly meaningless or absurd up here; it would be ridiculous for our gold mining operations to be required to clean up the environment according to the same rules. And our per capita income remains three times

higher than the U.S. and Europe while our standard of living is only forty percent as much. Their regulations are not designed for those numbers."

"True; we'd have to negotiate reasonable exceptions," replied Pete. "I doubt it would be difficult; we're Mars, after all, not Earth."

"And what about foreign aid formulas?" added Yuki. "They're based on per capita income, and ours is incredibly high."

"We'd want to negotiate that, too, but it would be good foreign policy to give away one percent of our GDP as foreign aid anyway."

"The business community is split about this matter," said Henry. "The mining companies do the bulk of their business with Earth and most would prefer geos. But locally based industries serving our domestic economy prefer the redback, if they can be sure it is stable and reliable. No doubt, its value will fluctuate. But so will the geo's, because of business cycles."

"And that points out the biggest possible problem," said Yuki. "The fluctuations in the business cycle on Earth will be controlled by raising and lowering interest rates. We won't be coupled to terrestrial business cycles very strongly because of our isolation and the high import costs, so our business cycle will fluctuate independently, yet we won't have control of our interest rates."

"That's a big problem," agreed Henry.

Will turned to Pete. "What do you think?"

"Joining the Grand Union will have advantages and disadvantages to us, and that may be one of the disadvantages. I happen to think that long term, the advantages outweigh the problems."

"I see. What do you say to the idea that we can always join later?"

"True, but at what cost? We should join at a moment of strength. If we wait until circumstances force us in, we won't get as good a deal."

"Hum." Will considered that. "Are we at such a moment of strength right now, and what moments of weakness we can anticipate in the future?"

"You can never plan these things," replied Pete.

"True, but you can make a few estimates. We have a lot of gold and platinum; we know they will remain valuable even if their value fluctuates. A collapse in their value won't be solved by joining the Grand Union and switching to the geo, either."

"It could even compound it, because we wouldn't be able to use currency reserves to buffer the blow," added Yuki.

Will looked at Pete, who hesitantly nodded.

"That resolves the matter," said Will. "We can't join the Grand Union and phase out the redback unless the benefits are clear. The people are proud to be independent and are proud of the redback. We can't ask them to give up their currency and independence so quickly unless the benefits are plain. I won't try to sell it to them until then."

Mike looked around their flat one last time. "I'm sorry I'm going," he said to Liz.

"Well, you aren't completely sorry," she replied, a bit hurt.

"No, not completely." He paused. "A six-month geology expedition that will cross the planet pole to pole and back and explore the bottom of the planet for rocks preserving its magnetic history: I admit, that's pretty exciting. We're going to see a huge

amount of this place. And the political tension here is almost enough to drive me crazy. I'm better off in the field."

"I don't know how it'll get resolved, either." She sighed. "I guess without you around, I'll have that much more time to plan the Christmastime ballet performance."

"But I will miss you. Terribly. And you know it." He leaned close. "We're inseparable."

"Well, you are separating!"

"I know, I know, and I'm sorry it's for so long, but we knew I'd probably go on a trip like this, and we knew it'd be long. I need it for my dissertation." He put his arms around her shoulders and stared into her eyes then gave her one very long, very passionate kiss. "That's how much I'm going to miss you."

"And how much I'm going to miss you." She pulled him close for another kiss.

"Videocalls won't substitute for that," he said.

"Not to mention great sex."

"Well, we'll have *really* great sex when I get back."

"Yes." She hugged him a long minute. The separation was going to be *hard.*

"Come on, I'll be late," he said with a sigh. She nodded and they both picked up a bag, then headed for the garage.

9

Changes

late Dec. 2066/Jan. 2067

The new stretch-class shuttle *Acheron* descended to the Marsian surface on a hundred-meter tail of blue-tinged orange flame. The rocket-fire touched the clay of Pad 8, kicking up dust and obscuring the area with a fog of ice crystals. Then the vehicle's legs settled onto the ground and the flame died back.

A mobilhab approached the vehicle, circled it to survey it from the outside while the pilots shut down vital systems, then moved in to dock. Half of the seventy-six people on board stepped through the pressure tunnel to board the mobilhab. The other half had to await the second mobilhab.

Will Elliott was in the arrival hall to welcome everyone. He knew a few of the old hands on the flight and had heard of a few of the younger ones. But he kept his eyes open for one particular individual: Commander Sridhar Pradhan, Ramesh's older cousin. Sridhar was one of the last to come off the second mobilhab.

Ramesh, Sarah, and the three children were waiting and greeted Sridhar warmly. He hugged and kissed his cousins and talked with them excitedly, but he spotted Will at the far end of the hall. He apologized that he had brief business with Will and walked over carrying a small bag.

"How are you, Will."

"Good sol, Sridhar," Will gave a hug to the 51 year old Indian. "It's been twenty years since you've seen Mars."

“I can’t believe the changes. I look forward to walking around Aurorae and visiting a couple of the other outposts in the next year and a half.”

“I’m glad you’ve been appointed Vice Commander of the Saturn mission, though I wish you were staying here. We could use you.”

“I’ll probably be back in a decade or so; in time for a graceful retirement. Ramesh has said I’m welcome to be part of their extended family.”

“Very kind of him,” said Will, though he suspected Ramesh had political motivations. “How was the flight?”

“Routine. It was fun to fly by Mercury; it reminded me of the moon. I wish I could have stayed there two years, *then* come here for Saturn.”

“I’m glad your crew made it safely. We already need the extra hands; I’m sending out forty personnel in two weeks to establish a mining outpost at Tithonium, and galleon construction is demanding more staff than expected.”

“More you’ve got. Two hundred seventy arrivals: this must be one of the largest immigrations on record.”

“It’s the sixth largest, pushing our total adult population up almost to 4,000. It’s straining facilities. Next year 1,200 arrive.”

“The stretch-shuttle has become available just in time. And you’re manufacturing it here; that amazes me.”

Will shook his head. “I wouldn’t call it ‘manufacturing.’ It’s just a Hermes-class shuttle with a cargo bay eight meters long instead of six. We have the ability to take a shuttle apart and insert a new, longer cargo bay in it of our own manufacture. What we really want is the ability to build a whole new vehicle, a ‘shuttle series 4’ we’d call it,

eight meters in diameter with a cargo bay ten meters long. We need the volume for the larger cargos we have to haul to orbit. We'll have the ability to put one of them together in another four to six years."

"And I bet it would transport about two hundred passengers at a time; with migration rates on the increase, it'd be very helpful."

"That's for sure. Are you staying with Ramesh?"

"No, I bought a flat in Baltic, near the Saturn facility. Ramesh wanted me to build a house at Canyon Meadows, but that's too complicated and I'm not staying long enough."

"I gather the housing lots there haven't been selling. I bet the cash flow is impeded. I hope you haven't mentioned the package to him."

"No, I haven't."

"Please don't, there's the possibility he might leak it to the media. We'll make an announcement that we can arm the constabulary if absolutely necessary, but we have to think about the timing of the announcement."

"Understandable." Sridhar looked around nervously. "You're by yourself?"

"What makes you think that?"

Sridhar looked around, wondering who else in the hall was inconspicuously with Will. He slid the bag's strap off his shoulder and handed it to Will, who took it gingerly.

"God, I don't like this," he said, but he took the bag full of pistols.

"It must feel like possessing atom bombs."

"No; I feel like Mars has gone downhill morally, that we think we need firearms. I wish Alexandra hadn't made the decision to import them. But this place is getting big and

we can't risk the safety of everyone. I doubt we'll need these guns any time soon. But we would be irresponsible not to have them, just in case."

"I understand. The sad thing is that eventually these guns will be needed."

"Exactly. Come by my office some time for tea and a chat, okay? We might be able to talk at the welcoming dinner, but it'll be so big we may not have time."

"Okay, I'll do that."

"Ciao." Will nodded a goodbye to Sridhar and turned for the exit. Across the hall, Kent Bytown and his wife Miranda started to move toward the exit as well, pushing a hand-cart full of items they had bought at Silvio's El Corte Ingles Department Store. Kent, the former chief constable of Aurorae, was now the Commonwealth's Director of Security. Aurorae's three constables were on duty and alert as well, positioned along Will's route to the Commonwealth Building. He walked the several hundred meters at a normal pace, and whenever anyone approached to talk to him he just apologized that he had an appointment and could talk only if the person walked along with him.

Will entered the Commonwealth Building a few minutes later and headed down to the basement. Kent entered a minute later.

"Let's see," he said, and Will nodded. Kent opened the package and put the three machine pistols on his desk.

"Most of the ammunition already arrived, right?"

Kent nodded. "By solar sailer last month."

"Do we have the use policy finalized?"

"The Supreme Court's reviewing it. Are you going to announce they arrived?"

Will considered the question. “We have to. Otherwise, it’ll leak and spark a controversy.”

“The announcement will have a deterrent effect as well,” said Kent.

“It could also have an ‘escalatory’ effect. I’ll have Jacaranda prepare a press release. It’s a shame, announcing something like this between Christmas and New Years, but I don’t think we should wait.”

The announcement three sols later was the lead item on *Mars This Sol* and created a buzz all over the planet. “I am appalled,” exclaimed John Hunter to his friend, Father Greg Harris. The two families were eating a late Sunsol lunch in the Gallerie after the interfaith service. “What are we protecting ourselves against, by importing these guns?”

“I don’t know,” replied Greg. “It makes me pretty uneasy.”

“I suppose I’d worry about someone smuggling a weapon to Mars or making one here,” said Vanessa, looking at her husband John closely. “It’s the government’s obligation to defend us in those circumstances.”

“But a reliable and accurate gun is much harder to make than a crude bomb. How would pistols defend us from bombs?”

“I suppose they wouldn’t in some circumstances, but they might in some sort of confrontation,” she replied. “And they might be useful if someone had a simpler weapon: a knife, a crossbow, something like that.”

“I think it’s hard to imagine a use,” said Greg. “And the implications are worrisome. . . simply having guns here symbolizes a degradation of our society.”

“I don’t know,” replied Vanessa. “We have ‘constables’ instead of ‘police,’ but let’s face it: they really are police. They aren’t armed, but maybe they will have to be on very rare occasions.”

“What if the guns are stolen?” asked Anna, agreeing with her husband’s point.

“I bet they’re locked up in a secure place,” quipped Maaka Hunter. Now sixteen, he preferred to hang out and talk to the adults, as did John Harris, who was just short of his sixteenth birthday. Esther Harris, 13 ½, and Wicahpi-luta Hunter, 12 ½, ignored the conversation and were playing nearby.

“They had better be,” replied John.

Greg leaned toward the next table, where Yoshiyaki Suzuki, head of the Zen monastery, was eating. He had attended the interfaith service. “Yoshi, what do you think?” He knew the monk was deeply committed to nonviolence.

Yoshi looked at the Catholic priest a moment. “I think we should draft a resolution defining Mars as a ‘weapons free’ world. We should define weapons as firearms and a few other things. And we should ask people to sign it, with the goal of getting it passed by the Council.”

“Ban weapons?” asked Vanessa, startled.

Yoshi nodded. “Absolutely. Where else in the history of human society could such an advance have occurred? No where. But it is possible here. We can change the culture here so that weapons are not needed.”

“Hum,” thought Greg, wondering whether he should raise the issue of human sinfulness. “There’s always the problem that someone might create a weapon.”

“’In the world of the blind, the one-eyed man is king,’” noted Vanessa.

Yoshi shook his head. “And what will one or two terrorists with weapons do? We can lock them into a place and wait until they surrender. Even if they took over life support they could not control this outpost. It’s too large and the domes are too autonomous.”

“And what if the ‘one-eyed man’ is a corrupt policeman who steals the guns and gives them to two friends?” added John. “Then the guns will be on the side of disorder.”

“Not much chance of that,” replied Vanessa. “I’d worry more about religion-inspired terrorism. It’s causing terrible troubles on Earth.”

“Preventing that is the responsibility of all of us,” replied Yoshi. “We are leaders in our religious communities. Religion on Mars largely lacks the fanatical edge it has on Earth. We’re immersed in religious diversity, which so far has minimized fanaticism. We’re immersed in agnosticism and skepticism too.”

“Not to mention, we don’t have high unemployment and despair among our youth,” added Greg. “I think you’re right, Yoshi. This is worth taking a stand on.”

“I’m not sure what Reverend Nnah will say,” said Yoshi. “This isn’t the sort of issue the Nigerians usually tackle. But I think Shaykh Omar Abdullah and Imam `Ali Karbilai will agree with us.”

“The Muslims?” exclaimed Vanessa, surprised.

“I agree,” said Greg. “They are horrified by the image of Islam on Earth and constantly stress it’s a religion of peace. They’re definitely in favor of non-violence.”

“The Green World Community would support nonviolence as well,” said Yoshi. “There are some secular people who will, also.”

“The Bahá'ís won’t get involved, though,” said John. “They avoid political issues, and besides, the Chief Minister’s a Bahá'í.”

“We don’t want this to be an issue of religious people versus unreligious people anyway,” replied Greg. “This is a legitimate issue; a chance to take a stand on the kind of society we are building up here.”

“Definitely,” agreed Yoshi.

Andalus Square thronged with people celebrating New Year’s. The huge screen on the outside of the Gallerie flashed the time: December 30, 2066, 24:05. When Will looked at it he was struck by its very Marsian nature, for Mars had no December 31—the sol was 39 minutes longer than the terrestrial day, so ten months of the year lost their last calendar day—and because they shouted “Happy New Year!” when 0:00 followed 24:39:35.

On the stage in front of the screen, a band called the Cowboys played American western music. When they finished there was scattered applause. “I like them better at the American pavilion during Equinox,” Ethel commented to Will.

“Their music is not mainstream, for this crowd. I rather like it, though.”

“Of course, you’re American!”

“When I lived in Houston I didn’t pay much attention to this kind of music. It’s not exactly the sort of thing you hear often in Stamford, Connecticut.”

“Ah, you’re American,” Ethel repeated herself, playing up her Scottish brogue.

“You’ll like the next band: ‘the Platinums.’ Their name is right up your alley.”

“And their music’s popular!” she added.

The Platinums—a fivesome of young men and women from India, Philippines, Germany, and Turkmenistan—stepped onto the stage to warm applause and started playing *I'm a Gold Miner*, their most popular ballad. It struck Will as not that different in tune and beat from the music of the Cowboys, but the lyrics were Marsian and were wildly popular with the crowd. He liked them, too, but the implied unease with American culture bothered him. He walked over to a refreshment stand to pour himself a glass of lemonade and swipe his credit card under the watchful eye of a computerized dispenser. As he was leaving, Nathan Rubin walked over to refill his beer glass and waved. "Happy New Year, Will."

"Happy New Year, Nathan. Any resolutions?"

"Resolutions? I suppose I'll start two new philosophy courses at Martech in 2067. What about you?"

"Catching up! I think I'll be able to do that, this year."

"Not many years will be like 2065 and 2066."

"A revolution, and independence and pretty complicated, but they're nothing, compared to setting up a government!"

"At least the Supreme Court is now appointed."

"Yes, all appointments are complete, the budget is passed, and the public has approved the Constitutional amendment. Those are big accomplishments in themselves. Now we have to tackle all the new departments, initiatives, and projects while strengthening good relations with everyone on Earth."

"Did you make the decision to purchase those pistols?"

"No, they were ordered a year ago by Alexandra when she was Chief Minister of the Authority."

"I thought that was the case. I suppose I read it somewhere. Frankly, I am appalled at the idea of arming our police. The danger to peace from an armed rogue policeman is at least as great as the danger from a terrorist. I'm surprised no one has spoken out; I'm particularly surprised the religious people up here haven't said anything. I'm drafting an op-ed piece for *Mars This Sol* calling for the pistols to be destroyed publicly, so we can all see the destruction. I could understand the police having tazers, even mace and tear gas, but not guns that shoot bullets. It's like. . . the American police a having nuclear weapons."

"I share your dis-ease about them," agreed Will. "Next week we'll be publishing guidelines about how and when the police can use the pistols."

"Good. But we don't need guidelines; we need to get rid of them. We are not a violent society. Guns are a drastic overreaction. I plan to work against them." He said the last with a strength and finality that startled Will.

"That's your right in a free society. I can't say I'm in favor of the guns, but now that they're here I figure we should lock them up and hold onto them against some situation in the future when there won't be time to import anything."

"Mr. Chief Minister, this is killing a rabbit with an atom bomb. There are non-lethal alternatives that could and should have been imported instead. I recognize sometimes society has to employ force, but I don't see the need for guns. They're too dangerous to everyone up here."

"You may be right, Nathan. I'll think about your arguments."

"Please do, Will. Have an enjoyable celebration." With that, Nathan nodded a goodbye and headed back to his seat with his beer. Will headed back to Ethel in a fowl mood; he hated moral dilemmas.

Liz glanced at the chronometer on the wall of the bedroom. It was easier for Mike to call her than for her to call him; in the cramped quarters of the mobilhab it was hard to predict when one could use the toilet or shower, whereas she could walk into their bathroom any time. She wished she had washed the night before; it was getting late to grab some breakfast in the cafeteria and get to daycare in time. But just then the videophone icon began to vibrate on her attaché. She pushed two buttons and projected him onto the full-sized three-d screen on the bedroom wall. "Good morning," she said.

"Morning, dear," Mike replied. "Sorry for the delay; someone slipped into the shower ahead of me this morning. Do you still have enough time?"

"Oh, sure." She didn't want him to hurry and end the call; she'd grab breakfast fast if she had to. "Did you sleep well?"

"Yeah, well enough. On these trips, everyone works long hours and compresses their sleep schedule. I was measuring paleomagnetism until 2 a.m. But we've got some great data! Let's hope these samples span the range of ages we think they do."

"The portable radiogenic dating equipment for the new mobilhab will help."

"Yes, thank God the machines are small enough. We've got data demonstrating six magnetic reversals spaced out over several hundred million years, assuming relative stratigraphic dating and the crater counting dates of the units. It's great dissertation stuff! I just emailed a summary back to MIT and my committee was pleased."

“They had better, they don’t have many students doing field work on Mercury!”

He chuckled and she listened to his laugh; she loved to hear it. “How are your plans?” he asked.

“Routine; day care 7:30 to 1:30 and then ballet and dance lessons. Tomorrow night I’ll start planning the Valentine’s Day event. We’ve got just six weeks!”

“You’ll do fine! Everyone loved the Christmas Program, even everyone down here, watching it on a little 3-d screen!”

“I know, dear, you’ve told me three times.”

“I love your dancing, you know that.”

She sighed. “Oh, I miss you!”

“I miss you, too! But there’s less than four months left to the expedition. In a few weeks we’ll pass the halfway point, and a month after that we’ll start back north. The light’s almost visible at the end of the tunnel.”

“I know. . . speaking of light, how’s the experiment?”

“With the solar sailer? I think it’s a great success, even if we’re getting barely three or four times as much light as the full moon. The problem is duration; we get the light for only two hours. But it’s fantastic to be able to look around and actually *see* the landscape around us! Otherwise it’s in pitch blackness or it’s too bright to look at.”

“This planet needs some moons! Or failing that, an inflated, and silvered sphere about fifty kilometers in diameter near the L2 point.”

Mike laughed. “Not any time soon, I’m afraid. The sailers do a pretty good job. I’d better go. Shall we talk before bedtime?”

She nodded. “I’ll be here. I love you.”

“I love you too. Bye.”

“Bye.”

She closed the connection with some reluctance and a lump in her throat; it amazed her how much she missed that wonderful man. But now she didn’t have much time. She headed for the bathroom and showered as quickly as she could, then dressed. It was 7:22 when she reached the cafeteria; just eight minutes to grab breakfast stuff and head for the daycare facility, which she had to open. Even though she was concentrating on filling her tray, she couldn’t help feeling the tension in the room. She looked around and saw Olaf Norlander and Christina Andropoulos. Olaf raised his voice at Christina and Liz could now hear the argument. “The Charter is a bunch of nonsense. The Trustees will never go along with it.”

“You’d better hope that’s true, Olaf, because it calls for the residents to elect the Commander.”

He shook his head. “Get serious, the Trustees will never approve of that.”

“You hope. You don’t know that. Saturn and Ceres will elect their commanders after arrival and Mars elects its Chief Minister. Times are changing, Olaf.”

“That’s your hope, Christina, not reality.”

“We’ll find out pretty soon, won’t we?”

He was puzzled. “What do you mean?”

“We sent the Charter to the trustees on January first, Olaf. It’s done and it’s been submitted.”

He was surprised. “You sent it already? It should have gone through me!”

“You opposed it, remember? So we sent it anyway.”

He was stunned speechless. She smiled, pleased she had confounded him. Then Christina turned and walked away from the buffet line where they had been talking. Liz looked around; everyone in the room had been listening.

Olaf stared at Christina, watching her go. He said nothing; he was so angry, anything he told her would be inappropriate anyway. Liz hurried through the breakfast line and dashed off to daycare where the conflict was of a very different kind.

Simin Sabetian had asked to meet Will in his office first thing Tuesol morning. Will had to hurry to the Commonwealth Building to get there in time for the Minister of Human Services's 8:30 a.m. appointment.

"What's happening; some sort of emergency?" he asked as he arrived and found her waiting outside his door.

"Of sorts." He opened the door and she followed him in. They sat in easy chairs.

"Sorry I can't offer you coffee or tea yet."

"That's okay." She took a deep breath. "Here's the story. A young single woman came to the hospital last week requesting an abortion. The details of her story are confidential. The pregnancy was unexpected and the father did not want to take any responsibility for the child. He refused to come in for counseling and we have no authority to require it. We gave the young woman four counseling sessions and she still wanted an abortion."

"Is it scheduled?"

Simin shook her head. "It was performed last night. There was no reason to inform you ahead of time because there's nothing you could have done, legally."

“I see.” He shook his head. “What a tragedy. She wasn’t willing to pursue adoption?”

“No, even though we have three full-time surrogate mothers who are on Mars just to bear children for women who can’t, and even though we have a waiting list to adopt children. She was told she would receive the full pay and benefits we give surrogates to carry the child to term, but she still refused.”

“What a tragedy. We have to pay millions to import every human life, and one we have here is snuffed out.”

“I know; I cried afterwards. The whole team that helped her is having a group therapy session. We’ll talk about how we handled the case. But it’s an evil to force someone to carry something inside her body that she doesn’t want, something unable to live without her. That’s the terrible dilemma. The regulations here do not forbid abortion and our medical plan covers the procedure.”

“Yet we’ve managed, in thirty years of reproductive crises of every sort, to avoid abortions entirely, until last night. We have an impressive record. But the news of this will probably leak out, and when it does it will be immensely controversial.”

“That’s why I wanted to let you know. You can be sure there will be criticism by the Catholic Church. Some terrestrial groups will condemn us strongly.”

“Our defense is that abortion is rare; one per 1,500 children born. Who can equal that? It’ll undermine our image as a utopia, which is taking a beating right now because of the controversy over the guns!”

“I know you like to get bad news out quickly so we can stay on top of it, but I would not advise an announcement or a planned leak. Her privacy should be respected.”

Will nodded. “I agree. We won’t release this information. But brief Jacaranda so she can prepare talking points. We don’t want to be caught by surprise by this one; if it comes out, we need to be prepared to discuss it. Have you considered revisions to our existing policies and procedures so that we’re more likely to persuade the woman to bring the fetus to full term next time?”

“I’m in consultation with three or four people at the hospital about that matter. But the process of revising our policies and implementing new ones increases the chance the news will leak. There’s no consensus among our hospital staff about abortion, just as there isn’t among our general population. No wants to see it happen and most people don’t want to forbid it. Some physicians won’t perform abortions on ethical grounds. Others feel strongly about a woman’s right to control her own body.”

“Could you focus on a larger issue, like reviewing all our counseling procedures? That way abortion wouldn’t be the issue.”

“We’ll probably do that.”

Will nodded. “You worry about the hospital side and I’ll deal with the political side. Anything else? How’s Human Services?”

“Human Services is doing pretty well. We’re planning Uzboi and Phobos campuses of Martech to open in 2070. Upgrades to all the clinics are underway and Phobos will get hospital status because of transportation issues. We’ve launched a new study of elementary and high school education because the current system of distance education for kids outside Aurorae isn’t adequate. Uzboi needs a more independent system; it’s got more kids. We’re setting up a new ‘Central Highlands Educational Zone’ based equally in Dawes and Cassini. The Meridiani outposts, two time zones to the east,

and Jumla, three time zones to the west, are part of it. A kid in Jumla can participate in a high school chemistry course via a video link at 9 a.m. local time with a kid in Kalgoorlie for whom the class is at 2 p.m. and with two kids in Cassini for whom it's at 12 noon."

"I take it there will be a 'Marineris Educational Zone' as well?"

"Exactly, for Aurorae, Uzboi, Phobos, Tithonium, and Aram. There will also be an 'Asynchronous Educational Zone' based here for kids in Elysium and Ceres. We may get a contract for educating kids on Mercury."

"I'm sorry the Lunar Commission decided to go with a company on Earth. They're negotiating to buy two galleons from us, one for Shackleton and one for Parenago, with angled floors that will have 0.6 gee. Once they're installed in about three years, the moon will have facilities with gravity adequate for children and families long term. That may start a lunar settlement trend."

"I gathered. I'm afraid they'll become competitors!"

"We'll just stay better. Thanks, Simin."

"Thanks for the time, Will."

"Glad to. Have a good sol." He escorted Simin to the door and saw her out. Then he closed the door and sat at his desk to contemplate the sad news she had brought. He closed his eyes for a full minute, then pulled out his prayer book to pray for the little soul who never saw the light of day.

10

Journeys

Late Feb.2067

The northern face of Layercake Mesa was quite steep. Will and Ethel found themselves panting as they reached the top even though the trail on which their sneaker-clad feet had trod had a dozen switchbacks carved in the bedrock and cleared through the huge pile of talus that had built up against the cliff over four billion years. The last dozen meters involved hiking up narrow steps chopped in a tear in the cliff.

But once on top of Layercake Mesa's vast, smooth surface of bare rock, broken only by the edge of Baltic South's dome, they sat on a bench and looked down with satisfaction mixed with awe.

"What a hike!" exclaimed Ethel, pleased she had made it.

"What a view!" added Will, gazing northward. From where they stood, the ground dropped sharply for a hundred vertical meters. They could see patches of ice nestled in pockets between the boulders, mute testimony to the profound cold still seeping from the rock pile. The rough cliffs and the huge pile of broken boulders below them were dotted by splotches of green: baby fir and birch trees carefully planted in pockets of soil where they would grow and convert the slope, in a decade, into verdant forest. Slashing straight down the mountainside was a ramp of dirt slowly turning green from newly planted grass: a future ski slope. The trail they had followed, however, had snaked back and forth across the slope, giving them a tour of the entire enclosure.

Baltic South extended three hundred seventy meters north of them and almost a hundred meters beyond the base of Layercake Mesa. The northern end of the dome was flush against the southern edge of Baltic Dome; the plastic end caps pressed against each other. Baltic ran another five hundred meters northward; between the two domes, a strip of Mars nine hundred meters long and one hundred wide was under plastic, warm, pressurized, and full of life. The southern end of Baltic proper was occupied by cobblestoned Baltic Square, its buildings built in pseudo-northern European style, with vinyl siding molded to look like red brick and roofs covered by fake gray slate. Baltic Lake, the outpost's largest water body, was just north of the square. Beyond it was farmland. Another agricultural dome, Baltic North, was under construction past the end of Baltic proper, extending the pressurized space another four hundred meters. Beyond it was rolling rangeland to the escarpment twenty kilometers away.

"I can't believe we've built something so huge," said Ethel. She was looking not only at the Baltic domes, but Niger and Serengeti to their west, now enclosed and turning green, and the complex of thirty domes that stretched for a kilometer to the east of Baltic.

"A Marsian miracle," agreed Will. He pointed to the bottom of the slope. "Do you remember walking down there for the first time? It was just you and me in pressure suits on sol 1, the afternoon of arrival."

She nodded. "February 28, 2036. In just a few sols it'll be thirty-one years."

"Almost half a lifetime ago. I was thirty-four years old and you were thirty-three. And now the slope has changed so much, it's hard to see where we walked or stood."

She squinted. "We walked along the edge of the talus, and that's where the vehicle tunnel goes under the dome, so the ground we stood on no longer exists at all!"

“I think you’re right. I never would have imagined that three decades later we would have converted the area into a ski slope and forest!”

“This space is controversial; one hundred million redbacks to make open space.”

“But all the critics have been on Earth! Last week *Mars This Sol* raved about it, and the reader comments have all been gushing. We needed a space like this.”

“I agree. It was well worth the investment. I love the soaring, high dome and the greater transparency of this design.” She turned around to look at the southern edge of the dome. Rather than building the steel and concrete base of the dome upward, the builders had excavated a trench in Layercake’s rolling bedrock surface and built the dome in it, so that the only thing emerging upward from the trench was a curtain of nearly transparent plastic. If one stood back, the trench was invisible and the plastic seemed to grow straight from the top of the mesa. “They did a great job designing the top, too. I thought there was an airlock up here.”

“There is.” Will pointed along the cliff edge to an inconspicuous entrance. “Over there. The changing facility and the airlock are in tunnels under the mesa and the exit is in the cliff side, so one can either go up to the top or down the slope. They wanted to disturb Layercake as little as possible.”

“They did a great job. I’m amazed they could enclose a dome across a talus slope.”

“It was tricky; the boulder pile was fifty meters thick in spots. They had to pour fifty thousand tonnes of eolian dust, sand, and water into the talus slope to fill up the void spaces; otherwise we’d have air leaks and the trees would never get started.”

“I see they cut basins for the trees on the steep bedrock surface.”

“Yes, and filled them with soil. A lot of work. The trees will grow beyond the basins and sink their roots straight into the bedrock.”

“And this dome will experience winter once per annum, instead of twice?”

“Yes, during dust storm season when the sun is weakest, which is also the time this north-facing slope gets the least sunlight. When the sun is in the northern sky the slope will get lots of light and heat, so we can’t easily make a winter then. But these species can handle seasons twice as long as Earth normal. We might as well have an interior space whose seasonal rhythms match Mars’s.”

She nodded and took a deep breath. “It even smells like a forest! The trees are already having an effect. And I even feel a breeze on my face!”

“I do, too! This dome’s long and high enough for convection. We’ve got to hike in here more often. It’s so relaxing.”

“And you need to relax, you never do. You need a hobby, Will.”

“He laughed. “Let’s hike up here twice a week. That’s the best I’ll manage, and we’ll spend the time together.”

“That’d be good. Next week I’ll be at Uzboi, but Marshall could hike with you.”

“That’d be nice, but not as nice as hiking with you.” He put his arm around her and they snuggled together.

“You’re working too hard. In the last year you’ve worked harder than I’ve ever seen.”

“It’s been hard. I have to follow and steer public opinion, which takes a lot of energy. It’s not like being Commander or Commissioner. It doesn’t feel like I’m getting much done, either.”

"Nonsense! You steered a Constitutional amendment through the approval process until it became law, you designed and got the first budget passed, and you set up the first sovereign government. You're setting the tone and the policies for the entire government; the ripples will last a century. That's a lot."

"I suppose." He paused. "I've got to clear up this gun issue. It's taken on a life of its own; the controversy just gets hotter."

"You did a good job with the abortion issue. Once it surfaced, within twenty-four hours there was an ethics commission to consider counseling guidelines and a hospital task force to draw up new policy."

"The hospital was already working on the task force; we just took credit for it, which is legitimate because it was the Human Services Minister who spearheaded it after proposing it to me. But the gun issue; what do you think I should do?"

"It's morally complex. I understand 'better safe than sorry'; it has wisdom behind it, even though it is not emotionally as appealing as the destruction of all firearms. But I also find appealing the argument that non-lethal force is as effective almost all the time and therefore firearms are unnecessarily excessive. The chance that a firearm will be needed in the next ten years when a tazer will not be enough is very, very small."

"I think that's true," agreed Will. "In which case, the negative message of obtaining firearms is not worth their positive benefit."

"I'm afraid that's right." Ethel shrugged.

"Alright," agreed Will. "Then we'll destroy them."

"What will Kent say?"

“Kent Bytown will be furious; it was his idea. I may want to get him and Father Greg together to debate the matter.”

“It will be a difficult and controversial decision, but I think you’re right.”

“So do I.” Will rose. “It’s getting late; Alexandra is coming to my office in forty-five minutes, then I have an appointment with Ruhullah. Let’s walk down the ski slope.”

“Okay.” Ethel rose and they walked over to the top of the ski ramp, a spot where the top of Layercake Mesa had been shaved down to form a ramp through the cliff to the talus slope below. “Great geology for ninth grade field trips,” noted Will. “They’re too young to go outside in pressure suits, so this will give them a place for a field trip.”

The slope was steep and the fresh soil, still damp from a dawn watering, was a little slippery, so they descended carefully. The ramp took them past a few spots they had missed on the hiking trail; at one point a great pile of tumbled boulders formed a series of short caves. “Kids will love to explore them,” noted Ethel, and Will nodded.

At the bottom of the pile, the ski slope stopped iat a clearing that was thirty or forty centimeters above a marsh fed by brackish springs seeping from under the talus. Young cattails were beginning to poke above the mud and small fish darted in the water while waterbugs skimmed across the surface. The effluent collected into a small, slightly sulfurous smelling brook—Mars’s only natural, permanent stream—which flowed thirty meters into a pond formed in two small craters. The excess was desalinated and shunted to a large holding tank that fed the dome’s irrigation system. They crossed the brook on strategically placed stepping stones, passed through the recreational building, and through a tunnel to Baltic. From there they headed their separate ways. When Will reached his office, he was surprised to see Alexandra waiting. He nodded to her.

“You’re early.”

“I wanted to talk to you as soon as possible, so I could implement the decision.”

“Okay; what do you have?” He pointed to a chair next to his long conference table but she shook her head and pointed to the balcony, so they opened the tall glass windows and stepped out, where they sat around a small, round table. Alexandra pulled out a big piece of electronic paper and touched a “1” glowing in the upper left corner. A large image of a bullet-shaped spacecraft appeared on the paper.

“This is the Ares; our fourth generation surface to orbit shuttle. It’s a radical departure from the variants of the original Mars shuttle that landed us here oh-so-many years ago. First, size: it’s designed to transport one hundred tonnes to Phobos or Embarcadero and two hundred tonnes to low Mars orbit.”

“Why so big? We’ll need to fly one hundred to two hundred missions per year for a decade to amortize the development costs. You’ve just committed us to launching ten thousand tonnes per year of cargo.”

“We’re already launching or landing three thousand. We have to plan for the future. Phobos is expanding fast: food production, ship construction, propellant production, and now light manufacturing. We’re their principal source of raw materials and have to be able to meet their needs.” She clicked on “2” and a table of data appeared to the right of picture. “The Ares is ten meters in diameter, larger than any vehicle on Earth. It won’t have a fixed cargo hold; the cargo will go in a fairing atop the tanks. We now have plenty of cranes to get it in and out.” She clicked on “3” and a picture appeared of an Ares with a bulbous cargo fairing. “This shows that we can launch cargos of a variety of sizes; they can be up to fourteen meters in diameter for launching, though ten

meters will remain the maximum for landing. The height can be as much as twenty meters. This will give us enormous flexibility."

"And will keep us ahead of the new shuttles under construction on Earth. Fuel?"

"Slush hydrogen."

"The engines will come from Earth?"

"Yes, and the avionics. But we'll build the fuselage and tanks and assemble the vehicles here. We have to; something like this can't be launched from Earth. That's another problem we'll be overcoming with the Ares: vehicles that have to be launchable from Earth have a whole set of constraints the Ares won't have."

"Have you thought about a passenger version?"

"We've started." She clicked on "4" and an Ares with a passenger module on top appeared. A cutaway revealed four decks, each packed with fifty acceleration couches. "We can fly two hundred up or down. The passenger version will be piloted; the cargo version usually won't be. The cockpit module will go in the nosecone and will come with its own heat shield, parachute, airbags, and landing rockets. It can be installed in place of the computerized avionics quite easily."

"Other markets?"

"No one else needs something this big; not for another decade. But they are interested in buying our used shuttles."

"Cost estimates?"

"We're using as much existing technology as possible. Development should be about ten billion redbacks, unit costs 500 million, and maintenance 5 million per flight. Assuming four shuttles transport 100,000 tonnes each at 100 tonnes per flight in ten

years, transportation costs will be 80 redbacks per kilogram, or a seventh the cost of getting something to low Earth orbit from terra firma."

Will smiled with delight. "This is very exciting! Will you have a formal presentation ready before the next meeting of the Council in April?"

"That's the goal, so the Council can approve the project. The first Ares will fly in four years after we begin. The engines are off the shelf models used for launches on Earth; that's one reason we're switching to slush hydrogen, they have far more hours of development and operation than anything we can design and build. It's much cheaper to modify hardware designed for terrestrial use than to start from scratch."

"Understood. Thanks, Alexandra. I'm really glad you're handling spacecraft design, it brings out your genius."

She laughed. "Thanks! I think it's true that administration doesn't play to my strengths as much as this does. How are you holding up?"

He shrugged. "I have a thick skin. If anything, I'm too patient with people."

"Yeah, that's important. You quieted the abortion thing down pretty quickly."

"It took a week of meetings and delayed my focus on a lot of vital matters, but at least it isn't controversial any more; not until another abortion happens, anyway! I'm about to start a similar round on the gun issue."

"Good luck. I hate dealing with things like that." She rose. "The Design Committee meets over lunch. We'll push the specifications forward and improve the artwork. We're working on major design issues, like the payload. The whole committee will want to meet with you in two weeks."

"Great. Thanks, Alexandra."

“Thank you.” She rose from the table and headed across his office to the hallway. Will went to his desk and opened his attaché. Before tackling his voluminous messages, though, he voice mailed Huma to set up a big meeting with Father Greg, Yoshiyaki Suzuki, Attorney-General Kumar, and Kent Bytown.

He was surprised to find a message from David Alaoui, who in his last month as Head of the Venus-Mercury Commission was proposing a radical solution to the Mercury situation. Will listened and agreed with his diagnosis. He had just finished with the reply when Ruhullah Islami knocked on his door.

“Good sol; is it time for your appointment now?”

“Yes, it’s 10.”

“Then come in. Goodness, not much time before your departure for Earth.”

“I know, it’s hard to believe; two and a half months! I just had my physical the other sol and I’m cleared for the flight. I’ll be 71 this year; that’s hard to believe too! Nadia’s excited and Maryam thinks she’ll be living in a mall and buying things all the time, so she’s thrilled.”

“Well, Ambassador Islami, I’m thrilled you’re going to represent Mars.”

“I’m greatly honored. I doubt I’ll stay more than four years, six at the most. Nadia and Maryam both say they want to come back here. I’m assuming they’ll still feel that way in four years. There’s no guarantee my health will hold up enough to make a three-gee launch from Earth possible, so we can’t plan to spend too much time there. Besides, this is a better place to raise a child than Earth, and the doctors say that if you’re in good health, the gentler gravity here is easier on an aging body. I’d like to live to see grandchildren. Of course, I’ll be at least 84.”

“I’m beginning to think I’ll be 84 before I see any grandchildren! Liz and Mike are waiting because they’re still not sure what planet they want to live on, and Marshall and Amy will probably have kids on Titan!”

Ruhullah laughed. “If Maryam waits, I’ll be dead first! I haven’t even worried about what planet she might raise them on.”

“Let me get you some tea,” Will said. He rose and filled two cups with fresh tea while Ruhullah opened the portfolio he had been carrying, spread out a big sheet of electronic paper, and activated the schematic. They added sugar and milk to their cups in silence, took a sip, then Ruhullah said “Let me show you my last projects as Mayor of Aurorae. These need Commonwealth funding.” He pushed a button and revealed a photograph of the residential dome with the poorest design in Aurorae. “Bangalore,” said Ruhullah. “Our ugliest, least pleasant dome. Only twelve years old, but with the most run-down housing because a typical unit has already had four owners. Property values are declining. The vacancy rate is ten percent even after a flood of arrivals, and at a time like this, between the major immigration waves, it’s fifty percent even though the dome borders on Andalus. The borough wants to buy the units, tear them down, and sell the land to developers.” He pushed a button and the monotonous forest of cylinders was replaced by housing around a square.

“Very attractive,” agreed Will. “We’re talking about one hundred sixty flats?”

“Yes, worth about 1.1 million redbacks each.”

“That’s a lot of money, Ruhullah.”

"That's why we need the Commonwealth's involvement. We'll recoup maybe eighty million redbacks. But the move toward low-pressure farmland will save a lot of money, so this is a good time to do this."

"Why not renovate the units?"

"It would be cheaper, but we'd still be stuck with the ugliest housing off Earth. Tear it down and start over; the result will be much better."

Will nodded. "And plan number two involves replacing the domes for Yalta, Shikuku, Riviera, and Catalina?"

"Exactly. They're twenty years old and the plastic's fatigued. We can't rate them for full pressurization any more. The best solution is one ninety-meter dome around all four of them. There's room to install a new dome in the skirting between the existing enclosures."

"Thereby taking the strain off the existing domes."

"And creating low-pressure farmland in the interdomal areas."

"We're going to have to do that project; the alternative is to close our four oldest domes, the ones that will receive 'historic landmark' status some day. But paying for Bangalore is more difficult. We'll save money on construction of domes for maybe five years, but a 'Congo' dome has been proposed as an extension of Niger and Serengeti up the side of Layercake Mesa—an African rainforest next to our northern European forest—and we need to establish limited public transit because Aurorae is getting too long to walk easily, and that is *very* expensive. We also have to set aside a significant revenue stream for a business development bank and a substantial chunk of cash will be needed to develop and build the Ares-class shuttle. Then there's the need to upgrade our

robotic manufacturing systems so that we can remain competitive; that's a multi-billion redback investment. My guess is that renovation of Bangalore can't start until 2070."

"Three years." Ruhullah sounded disappointed.

"Most likely. We're using labor faster than we are importing it; we still have a shortage. Renovation is hard to fund and housing is tight, so the units will still rent or sell. And the units have some life left in them. We should use the three years to buy them up, so we don't have to use eminent domain to condemn them. That'll cost fifty million per year, and we might be able to find that."

"That's probably the best we can do. We can do the work in phases."

"I think so. I'll huddle with the Treasurer about it tomorrow. But money is tight."

Liz dreaded her mornings in Concord's Daycare facility. She was usually alone with six kids ranging in age from one to five years old. While she had gotten a degree in early childhood education and had acquired a fair amount of experience on Mars, nevertheless she had found that daycare was not a career choice she would pursue long term.

Fortunately, after lunch—which was usually served at 11:30 a.m.—the kids took a nap, except sometimes the two older ones. At that point she could see the light at the end of the tunnel, because when they woke up about 2 p.m. her replacement had arrived and she could go to her studio, where older kids would arrive for various lessons starting at 3 p.m. She had never planned to be a dance teacher, but she found she loved it.

That day—March 3, 2067—the kids went to sleep a bit late, but when the last one finally fell asleep she sighed with relief. Normally she would eat lunch, but the Bahá'í Fast had begun the day before, so she wasn't eating or drinking anything until "sunset,"

artificially set at 6 p.m. in Concord. Food being forbidden pleasure for the next seventeen lunchtimes, she retreated to her desk and opened her attaché to read news and generally catch up. The headline on the *Mercury Today* website was both startling and exciting:

Norlander Resigns

She stared at the headline; she was so surprised she wondered whether it would go away if she blinked. But it didn't. She skimmed the article because she was so shocked she couldn't concentrate on it. Then she took a breath and read it more carefully. It didn't say much. Then she stepped outside the door and called Mike.

His attaché rang several times and when he answered it she could hear shouting behind him. He looked at her face on the screen. "Liz, you heard?"

"Yes, I wanted to make sure you did!"

"About half an hour ago; I guess that's when the article went up."

"Why didn't you tell me! No one tells you when you're watching kids!"

"I knew you were putting the kids down for their nap, and we had just come inside from an EVA and had docked the three vehicles together for lunch, so all of us were together. We e-mailed some folks in Paris, too. Alaoui asked Norlander to resign."

"Really? He acted?"

"Yes, I guess this dragged on and became too much of an embarrassment."

"The article says Patrice Dumkowski has been appointed to replace him. That doesn't strike me as being any better!"

"The people down here, who dislike Norlander, all like Patrice. And our contacts in Paris say Patrice is temporary and we'll elect the next Commander."

"Really?" That shocked Liz. "You mean we've just lived through a revolution?"

Mike laughed. “I guess so; a slow-developing, democratic revolution! Mars has set a lot of change in motion!”

“I guess so! Wow!”

“By the way, we’re coming back right away. Patrice has to come up from Caloris, too. This is a big change and everyone has to be together for it.”

“Can you drive all the way up?”

“The Caloris route is in darkness; the sun set on the last segments of it two weeks ago. So we’ll drive to Caloris Outpost and take the Caloris Trail.”

There was a loud laugh behind Mike. “Boy, they’re really celebrating!” said Liz.

“Big time. Let’s talk later when things settle down; it’s hard to hear you.”

“Alright,” replied Liz reluctantly. She didn’t want to close the circuit and miss the excitement. “We can talk in two or three hours. Bye.”

In spite of the distracting news from Mercury, Will was able to get Yoshiyaki Suzuki, Greg Harris, Kent Bytown, and Indira Kumar together in his office at 5 p.m. that afternoon. Huma Mubarak attended as well to take notes. Since neither side knew the others had been invited, they all looked at each other nervously.

“Okay, let’s get started,” said Will, after he had personally served tea and coffee to everyone. He looked at Greg and Yoshi. “Let’s start with tazers. What do you think of them?”

“Much better than firearms,” replied Greg. “No danger of depressurization and they don’t kill, just immobilize.”

“I’m not so sure,” replied Yoshi. “We’re talking about instruments of coercion and violence. They can be abused even if they’re non-lethal. And they symbolize force.”

“Yoshi, I thought you Buddhists stressed the practical,” said Will. “There has never been a society that did not need to use some violence to suppress injustice.”

“Never, yes; *not yet,”* he replied. “The Buddhist ideal is nonviolence. This is the Christian and Muslim ideal as well. And this is a different kind of world, more stable and peaceful than Earth, more democratic, more centered on the primacy of law. We may not agree with the laws, but we agree we must respect them.”

“Do we?” asked Kent. “What if disillusionment leads to the use of violence?”

“It hasn’t yet,” replied Yoshi.

“But what if it does?” persisted Kent.

“Then you use nonviolence to curb it.”

“You’ve already used non-lethal force to prevent a tragedy,” added Greg. “I refer to the attempt to smuggle influenza germs to Mars and release them. You didn’t need firearms or a taser to prevent that.”

“That could have played out other ways, though,” responded Kent.

“Kent, are there circumstances when only firearms might be effective?” asked Will.

“Sure, there are thousands of possible scenarios.”

“Like what?”

“Let us say someone managed to smuggle a machine gun onto Mars. Three or four officers armed with machine pistols would be essential to stop such a person.”

“But couldn’t tazers, or tear gas, or cutting off oxygen, have worked equally well?”

“Perhaps; you really don’t know for sure.”

“What about better inspection of cargo and personal property to make sure no one smuggles in a machine gun? They’re pretty hard to make, too.”

Kent shrugged. “We already have an excellent customs department, but nothing is fool-proof.”

“True.” Will weighed Kent’s words. “Yoshi, do you really believe we can establish a world totally free of violence and coercion?”

The abbot hesitated. “That has been the Buddhist ideal for twenty-five hundred years, and we have never abandoned it, regardless of social conditions. It remains a goal.”

“A goal, yes. But your spiritual ancestors developed the martial arts not just as a form of mediation but for self-defense. It was a disciplined form of violence to preserve one’s own life while doing minimal harm to another.”

Will’s comment caught Yoshi off guard for only a moment. “You are correct; but medieval Japan and ancient India or China are not Mars. We can do better.”

Will had never expected the Zen abbot to take such a position. He turned to Greg. “Do you believe we can establish a world totally free of violence and coercion?”

Greg shook his head. “That is not a Catholic, Christian, or biblical teaching. The doctrine of original sin says humans can never achieve perfection, and you’re talking about a type of perfection. Otherwise the use of coercion by government is inevitable.”

“We won’t achieve perfection or even bodhisatvahood, especially in a largely non-Buddhist society,” commented Huma, referring to the Buddhist ideal of the one who

was filled with compassion for others and fully enlightened. Will looked at her, surprised that a good Sunni would know anything about Buddhism. He turned back to Kent. “I have yet to hear a scenario when we have no alternatives to firearms.”

“When someone else has a firearm.”

“But surely we can prevent that, and if one person has a firearm surely tear gas and a good supply of tazers, plus patience, will be sufficient?”

“Probably.”

Will looked at Indira. She said, “We’re pretty small for terrorism, we don’t have drug trafficking, and so far no one has robbed a bank, which would be foolish with all the cameras around.”

“Especially if we establish the public safety program we’re considering, which would involve training fifty people at Aurorae in skills for public safety and security. That’s a lot of people able to arrest troublemakers; a lot of people able to fire tazers.” He looked at the others. “Here’s what I propose. Kent will determine what non-lethal instruments we will import: tazers, mace, tear gas, pepper spray, etc. We’ll consider the scenarios when we might need such instruments. And we will destroy the firearms.”

“Destroy them?” said Kent, startled.

Will nodded. “Destroy them, and sooner rather than later. We’ll select a Sunsol afternoon, take them to Andalus Square, and smash them with a sledge hammer in full public view. We can invite everyone to strike a blow. Destroy them.”

“Will, it’s not good enough,” said Yoshi.

“Yoshi, you don’t have the responsibility that I do. Public safety is everyone’s concern, but the buck stops with me.”

Kent's mouth was open, but he said nothing. Will replied to his concern, "Look, as long as it costs millions to import people and we have a screening process, we can afford to trust the public at a higher level than one can on Earth. But I won't guarantee that we'll never need firearms; as this place gets bigger, they may become unavoidable. And I wouldn't be so sure that a dozen tazers is better than three firearms."

11.

The Middle Way

late March 2067

Will looked up from his desk when he heard a knock at the door. He smiled; he was always pleased to see Jacquie Collins. “Come in, Jacquie; good sol to you.” He pointed to the table and stood up from his desk. “Tea or coffee?”

“Black coffee, thank you,” she replied. He poured her a cup and refilled his cup with tea, then walked over to the table where she had already sat.

“Are you ready to head for Tithonium?” he said, handing her the cup.

“Yes. Thanks.” She took the cup and sipped a bit. “I skipped my usual morning cup because I knew you have excellent quality coffee! Preparations for departure took an extra month, unfortunately. We leave tomorrow morning right after dawn and should start setting up the outpost early next week.”

“Excellent. You’ve got . . .thirty in your team?”

She nodded. “Thirty construction workers, three mobilhabs, three conestogas, a ranger, a portable nuke, three trailers of construction equipment, and five truckloads of cargo. It’ll take two weeks just to get there; we’re upgrading the oases with more solar arrays so they can make enough methane and silane for the heavier traffic.”

“I wish the Transportation Department had gotten that done last year.”

“The upgrade to highway status is scheduled for 2070. I’m not sure I’ll still be at Tithonium, then.”

“I suppose the first question is whether you get elected Chief Clerk next May.”

“There won’t be an election sooner?”

“I don’t think so. When will phase one be finished? I’ve heard several dates.”

“Our goal is to get the first dome—a hundred by hundred—up in six months and the first building completed a month later. After that the construction crew can move out of the Mobilhabs and you’ll get them back for other work. It’ll take three months more to get a second building completed—that’s early February—and at that point the gold recovery team and their equipment can arrive.”

“Regular elections are scheduled for March 30; no reason to hold your local election in February. But the constitution lets me propose to the Council a delay of up to six months and we’ll have a huge influx of migrants in March and April, so I’ll probably propose a delay to late May.”

“That’s good to know.”

He leaned toward his attaché. “Anisa, ask Huma to draft a memo to the Tithonium crew that their election will occur when the regular election occurs, and ask Indira to draft legislation to delay the election until late May.” The attaché’s screen flashed “acknowledged.”

He turned back to her. “We’re looking forward to Tithonium coming into production. It could produce thirty or forty tonnes of gold per year with a crew of seventy to one hundred. I hope it can get to that level in two years.”

“We’ll try. Phase two includes a second dome, more buildings, and agriculture, even though Tithonium’s one of the lowest spots on the planet and very dusty. The gold reserves are good for several decades and there’s chromium and high-aluminum feldspar

nearby. Don't assume Tithonium will peak at one hundred residents. It has immense tourism potential, with the escarpments. A hotel will be an early priority."

"Tithonium has huge potential, and I'm glad you realize it. I'm delighted you've come to Mars. I was very impressed when I saw your c.v. You have a great ability to encourage, mentor, and lead people, which is exactly what we need."

She smiled. "Thank you, you're very kind. I've been studying your leadership style. In the last few months I've seen a growing polarization in the Marsian media over various issues like abortion and the firearms. I've been curious to see what you have to say about them, but so far your statements have been fairly short. Have you seen the statement by the Marsian Values Initiative?"

"I saw it this morning in *Mars This Sol*, but I haven't yet read it."

"Their goal is to define 'Marsian values' and their approach is. . . well, I'm not sure how to define it. Their moral values are conservative but their social policy is focused on issues of fairness and justice, which means governmental intervention."

"The Marsian way is a middle way; it calls for social supports and moderation in the moral values we impose on a secular society. I'm sure it'll generate debate."

"You should comment on it."

"Maybe I will."

Mike stared out of the mobilab's second story front window, scanning the shadowed horizon for Concord Station. The seven thousand kilometer trek from their geological field assignment to Caloris Station and then home had taken almost three weeks. Caloris

station's entire crew had joined them in the slow roll across Mercury's darkened hills and plains, ever northward to their planetary headquarters near the pole.

Finally, Gamma's big, flat sandbagged roof and its brightly reflecting sides hove into view. Beyond it, Alpha and Beta soon could be seen. The vehicles slowed as they approached Alpha's surface vehicle facility. The mobilab drove into a large, open garage and pulled up to an airlock, to which it docked; the other vehicles lined up to enter the pressurized garage or approached other airlocks.

Mike grabbed his bag and hurried downstairs. Eight of them had shared the space for five months; it had a lot of memories. He glanced at a huge bag of rock samples he had accumulated.

Clanks from the docking tunnel announced that it had locked into place. They had to wait a minute for the short tunnel to pressurize and everything to be verified. The tunnels often leaked slightly; they weren't kept open at both ends very long. The bigger issue was verifying that the locks were all securely in place.

The light over the tunnel turned green and they opened the hatch. Someone opened the other end as well. Mike stooped and walked through the narrow tunnel, ignored the slight hissing that come from the outpost end, then stepped into Concord.

Liz was waiting for him and he dashed to her as she dashed to him. They embraced and kissed. "You're back!"

"I missed you."

"I missed you, too." She smiled and he kissed her again.

Another hatch opened and Patrice Dumkowski entered, bags in hand. His wife was right behind him. A stream of crew followed. He looked at the eight of them and the four exiting from a Conestoga at a nearby docking port.

"It's 11 a.m.," said Patrice. "Lunch is at noon and we're having a staff meeting at 1 p.m. I want everyone there."

"Just two hours!" said Mike.

"Just two hours. The meeting can't wait. You'll have the rest of the afternoon, the evening, and the night free, don't worry."

"Okay," said Mike reluctantly. He turned to Liz. "Let's go."

She nodded and grabbed one of his bags. "I think you'll like the changes."

"Yes, I'm curious about the decorating. I wish you had let me see!"

"I wanted it to be a surprise." She smiled; he laughed. They started down the corridor. "Are you going back out after the meeting?"

"There's still no decision from Patrice, but I can't imagine we'd travel 7,000 klicks to finish four more weeks of work. Sunrise will sweep across the route in two months, so it wouldn't be much of a trip."

"Do you have enough samples?"

"I think so. I have to email my advisor. I can't wait to see your new dance piece."

"It's nice, and the kids have really improved in the last week or two. Maybe it'll help calm the mood around here."

"That depends on what Patrice does."

She nodded. They continued to chat all the way to their flat. As soon as Mike opened the door, he smiled. "Wow! Where did you get this?"

"I didn't; it's sponge appliqué of blue and white paint on a beige background."

"You *did* this?"

"Sure, it wasn't hard, it just took some time, and with you away I had the time."

"It's really. . . beautiful!" He glanced into the bedroom and saw that its walls were also painted, though they were a mix of green and blue. He walked in, pulled by the colors. Whereas the living room walls graded from darker to lighter blue from floor to ceiling, the bedroom walls graded from blue to green and then to white. "It looks like water grading into vegetation and then into sky!"

"That's right, you got it!"

"It's sort of impressionistic; Monet would be proud!"

"I don't know about that, but half the station's come to look and everyone wants me to paint their spaces!"

"You have a new profession!"

"I'm afraid so. Maybe one of them can buy this place."

He was surprised by her comment. "So, you don't want to stay?"

She looked at him. "No. We've been here ten months, I've adjusted to Mercury, I like the place, but I like Mars better."

He nodded. "Yeah, that's my view, too. By next summer I'll be ready to leave."

"That was our plan all along." She turned to him. "What a relief to have you back."

He looked into her eyes and kissed her. Mike pulled his bag off the bed so that it was available for other use.

By the time they reached the cafeteria, almost everyone had finished lunch; it was close to 1 p.m. The menu was special and very little was left; they scraped the pots to enjoy Mercurian rabbit and tilapia with rice, vegetables, and fresh bread. They barely started eating when Patrice Dumkowski rose to call the meeting to order and everyone quieted down. “Hello, everyone,” he began. “Well, here we are: 101 human beings, the entire population of this world. And we are gathered here because we have been given a new collective responsibility together: electing our own leadership. This has been a rumor, but I am now confirming it. The Commission offered the command to me and I said I would take it only on the condition that it be a transitional position. My view is that we shouldn’t wait; we have a charter we approved, so we should implement it and hold our election in the next week. A week will give us the time to review the provisions of the charter, discuss the election, and vote. We can focus on that task, then in another week we can resume our regular tasks.”

“We’ll elect in a week?” asked John Aylmer.

Patrice nodded. “One week. Plenty of time to talk together. Plenty of time for our thinking to evolve together. We can gather here in this room every day, all day, if we want. I’m keeping official duties at a minimum for the next week; just necessary tasks like the gardens and life support maintenance. I’ll update the schedule this evening.”

There was silence as everyone looked around. “I have one more thing to say,” continued Patrice. “Olaf deserves our gratitude and recognition. He has skillfully led this place for a decade. He guided its expansion from twenty-five to one hundred one. He pushed for the establishment of Caloris and pioneered our current exploration system. In

short, we have much to thank him for." Patrice turned toward Olaf and began to applaud. The rest of the station gradually followed until almost everyone was applauding.

Olaf nodded. "Thanks," he said, touched.

"Okay folks, that's it," said Patrice. "It's a short meeting. Let's reconvene tomorrow after lunch to study the charter together."

Marshall and Amy always enjoyed eating with Rahula Peres. The thirty-three year old had a gift for gab, as the Saturn mission's director of fabrication and engineering he always had some interesting ideas, and he was not the boss of either of them, so they could talk freely.

"Thank God the thermal areas have a lot of carbonaceous and metallic solids," Rahula said to Marshall, while they discussed the prime landing site over supper. "We'll need the sodium, iron, aluminum, phosphorous, potassium, and sulfur."

"Don't worry, we'll have plenty; the prospectors have made that clear," replied Marshall, referring to the robotic rovers exploring the site. "The one element that's absent in reasonable concentrations is copper."

"Yeah, but we can use aluminum. The new techniques will extract it adequately."

"The other elements are mostly needed for agriculture," noted Amy. "The new extractor appears to convert tholins pretty well, so we have the biggest problem licked."

"So agriculture's on target?" asked Rahula.

"Definitely. We should be able to meet our minimum needs within eighteen months of setting up the greenhouses. They'll reach nominal production in two years, freeing up the galleons for other use."

“That’s more optimistic than Tomas’s report.”

“He tends to be conservative, and the new extractor’s test results came back just yestersol,” she replied.

“That’s good news,” concluded Rahula. “Especially if our upcoming simulation at the north pole works out.”

A young man in his mid twenties approached the table. He had light brown skin and straight black hair, like Rahula, who looked up and smiled. “Hey, Muhammad, good sol.” He turned to the others. “This is my cousin Muhammad Peres. Muhammad, this is Marshall and Amy Elliott.”

“Pleased to meet you.” He reached out and shook hands with both of them.

“Your name is Muhammad?” asked Marshall. “I thought Rahula’s family was Buddhist.”

“I’m from the ‘black sheep’ branch,” replied Muhammad, with a wry smile. “The rest of the family’s still unhappy my father converted and married a Muslim.”

“It isn’t a problem up here,” added Rahula quickly. “After all, our last name ‘Peres’ is Portuguese and Christian. Sri Lanka has seen a lot of visitors in the last thousand years, and there’s been a lot of conversion. My grandparents converted to Buddhism from Catholicism, but go back three centuries and their ancestors converted to Catholicism from Buddhism!”

“And ironically, my middle name is the same as his father’s: Dharmapala,” added Muhammad. “Which means ‘defender of the dharma’; think of it as the Buddhist equivalent of ‘defender of the Faith’!”

“I have a Bahá'í friend named Christopher, which means ‘bearer of Christ,’” noted Marshall. “So, when did you arrive; this last trip?”

“Yes,” replied Muhammad. “I’ve been here three months. The adjustment is over and I have a furnished flat.”

“What do you do?” asked Amy.

“I coordinate payment collections for the banks and stores.”

“Really? We need someone up here to do that?” asked Amy.

Muhammad nodded. “We have several hundred people who collectively are overdue on payments of three million redbacks. We have people on Earth tracking late payments and emailing reminders, but I make phone calls to them, negotiate repayment plans, and run credit management classes.”

“Wow. We’re so big, we need a collections officer,” said Marshall.

“I’m glad someone can view my job positively!”

“My impression is that the financial situation has improved in the last few years,” continued Marshall. “Six years ago new arrivals were in pretty tight financial straits.”

“They still are. Some things are better: most arrivals sign up for a ‘time and a half’ contract the first year, which requires long work hours but almost doubles their salary. It’s not a great arrangement for their morale or health; it causes loneliness, drinking problems, and unexpected pregnancies. But the range of things to buy has expanded enormously. I can testify to that from personal experience; I have a thirty-five square meter flat and I should have gotten a twenty square meter efficiency instead. The mortgage payments are killing me. I should have bought used furniture instead of new. And those who take interest-only mortgages reduce the pain now but increase it later;

we're seeing debt problems and bankruptcy not just in new arrivals, but among people who have been here six or eight years. The economics of this place are not easy."

"All the new clothes and consumer goods are temptations," added Rahula. "Imports are still very expensive, so business startups can charge a lot for goods as long as they charge less than the import cost. Since we're small, competition is hard to establish, so prices don't get driven down."

"Well, the export market drives down prices somewhat," replied Marshall. "My sister buys the same Marsian-made stuff we do. The businesses can't charge too much or they can't compete against Earth businesses."

"They charge a different wholesale price for the export market," countered Rahula.

"Expectations go up, too," added Muhammad. "In the last thirty years, compensation here has increased very little if you include housing and food allowances. Salaries for new arrivals actually dropped, though they leveled off five years ago. Meanwhile, first world salaries have doubled because of economic productivity. Our incomes here are now 3.5 times higher than in the U.S. and four times higher than in western Europe, but our cost of living is ten times higher. It's an economic hardship post, but many want to continue living the way they did on Earth. That causes lots of trouble."

"They have to adjust," replied Marshall. "We have the same problem with the Saturn mission. Our lifestyle will be much simpler and choices limited."

"Yeah," said Muhammad, shaking his head. "I'm surprised you guys are actually considering a settlement on Titan rather than a cave on Enceladus. Titan's like living in a warm oxygen bubble inside a liquid methane tank!"

Marshall and Amy were startled; Rahula kept eating as if he had heard it from his cousin before. “I mean, Titan’s a long way away, it’s dark, it’s orange, and it’s damn cold; I find it hard to believe anyone would go there to live.”

Marshall shrugged. “ ‘Mars is red, barren, dry, and cold; I find it hard to believe anyone would live there.’ That’s what people said forty years ago. And here we are.”

Muhammad scowled. “This place is civilized. But Titan’s got a week of darkness followed by a week of orange dimness, and this place is balmy by comparison.”

“So? The greenhouse domes and housing will be heated and lit up by nuclear and geothermal power, and they’ll be pretty spacious. The ‘orange dimness’ is plenty for exploration; once your eyes adjust it’s not that different from sunlight here. Methane rain will limit human exploration, but Titan’s pretty dry. And the science is great.”

“I suppose; but it’ll take almost two years to get there.”

“We’re staying at least five or six years, and some will stay their whole career. A two year voyage is acceptable. It’s not like we won’t be busy.”

“But what about property? No one can afford to pay for condos.”

“No!” replied Marshall adamantly. “Our pay there will be triple the pay here so that we can afford them.”

“But how will Saturn afford salaries like that?”

“Saturn won’t cover its own costs for decades. Mars didn’t either.”

“I suppose it’s the only way to explore the outer solar system.”

“The only way to *settle* the outer solar system,” corrected Marshall, raising his voice a bit. “We don’t know what the outer system will contribute to the overall human economy, but we can be sure that in the next century the worlds there will make a

contribution. This is a long-term project. Humanity's finally getting beyond its usual short-sightedness and planning ahead."

Muhammad frowned at that comment. Amy decided it was time to change the subject. "Muhammad, since you see the financial troubles here, what do you think of the new 'Statement about Self-Reliance' that was in *Mars This Sol* yestersol?"

He shook his head. "They're wrong-headed. I'm not against self-reliance, but self-reliance doesn't mean economic nakedness and helplessness. It means having the resources to build a career and a living for oneself. These self-reliance people are just selfish, capitalistic businessmen."

Amy was startled by that. Rahula responded. "It was a response to the Mars Values Initiative's statement stressing social justice and social supports, which was championed by several groups, among them Catholics, Buddhists, and Muslims." He looked at Muhammad. "Can you think of a better description of our family?"

"I understand," said Amy. "But to call them selfish capitalists; that's strong language. And many of them are people of faith."

"Evangelicals, Nigerian Christians, and the LDS; they're all business-oriented groups," replied Muhammad. "They stress personal salvation. The first two groups don't even believe free will plays a role, God does everything."

"It sounds like the individual enlightenment orientation we Theravada Buddhists are accused of," said Rahula. "I think it's a cultural value as much as it's religious."

"Could be," replied Muhammad. "But we Muslims have the teaching of zakat, the giving of a certain percentage of your income to support the poor. It's a principle of social responsibility. Catholics stress social justice as well, and near as I can tell, it's a

teaching of Jesus, peace be upon Him. And Sri Lankan Buddhism, in the last century or so, has had a very big emphasis on development."

"There are a lot of secular people stressing social responsibility as well," added Marshall. "There's a Socialist Club forming to emphasize social responsibility."

"Without the moral orientation of the Mars Values Initiative," complained Muhammad. "They want a commitment to abortion choice and personal sexual freedom."

"So now we have three groups," noted Amy. "One stresses morality and social responsibility; one stresses morality and self reliance; and one stresses personal moral freedom and social responsibility. How long before a fourth group comes along to stress moral and economic freedom?"

"A matter of time," replied Rahula, smiling. "I suppose it's a sign of our growing sophistication as a civilization that these viewpoints are crystallizing."

"I suppose it's inevitable," agreed Marshall, reluctantly. He glanced at his watch. "We've got to get going. Good to meet you, Muhammad."

"Delighted to meet you as well," he replied.

Marshall rose. Amy was surprised he was leaving so quickly; she rose as well and carried her tray to the nearest cart, then they walked out of the Gallerie. "Why are we going so fast? We're just going home to watch tv."

"I want to ask dad about this."

"What? The factions?"

"I guess that's a good term. "I don't like this fragmentation of our society."

"Fragmentation or diversification?"

“Diversification, if people don’t get in vicious fights over these values issues. Then it becomes competition for power and that leads to all sorts of political corruption.”

“I suppose that’s inevitable.”

“I hope not.”

They stepped out of the Gallerie and into Andalus Square. The sun had just set and the western horizon still had a faint glow, thanks to a bit of dust in the air. The square’s lights had come on and the edges where the cafes had tables set out were bright. They crossed the square and headed up the alley leading to the Elliott residence. When they reached the front door Marshall said “open” and the door unlatched. They stepped inside.

The living room and its garden—public parts of the house mostly for entertainment—were dimly lit, the fountain providing the only noise. They walked back into the kitchen, then into the private wing. Ethel was watching tv in the family room; Will was in his home office and he stepped out as soon as he heard them.

“What brings you around?” he asked.

“We wanted to stop by to say hello,” said Marshall.

“How’s the project?” asked Ethel.

He nodded. “Really good. Everything’s falling into place, the training is giving us a lot of confidence, and the construction teams are setting up the galleons really well.”

“You’re rotating up next month, right?” asked Will.

Amy nodded. “For six months. It’s our turn to learn about wiring, pipes, life support equipment, and turbopumps.”

“And set up our flat on board,” added Marshall. “There’s even talk of a flight from Phobos to Deimos and back; the galleons are just about ready for that.”

“The progress is impressive,” agreed Will.

“When are you going to Uzboi?” Amy asked Ethel.

“Two weeks. I’ll be up there for three weeks to conduct staff reviews and lead some staff meetings to review procedures, make changes, and discuss next year’s production goals.”

“Higher?” asked Marshall.

“Always,” replied Ethel.

Marshall plopped down on the couch. He looked at his father. “Between the Mars Values Initiative and the Self-Reliance people, and now a Socialist Club taking shape, this place is getting rather torn up.”

“I suppose it’s inevitable; we’re too large a group to handle everything via face-to-face discussion. So groups form and the media because the debating forum.”

“But what if they start to compete for power? Look at the U.S. Presidential campaigns. The candidates spend billions of dollars screaming and lying about each other for a year and a half.”

“I know, but this isn’t a Bahá'í society; it’s a secular society. If you want to avoid the screaming and yelling, everyone will have to become a Bahá'í, because I don’t think the Bahá'í values that make for peaceful, spiritual elections will be accepted otherwise. We’ve done pretty well so far, but as this place gets bigger you can expect more politicking.”

“There’s nothing you can do?”

“There’s a lot I can do. Last week Jacquie Collins urged me to write more. So I’m working on a series of articles for *Mars This Sol* defining ‘the Marsian way’ as a ‘middle way’ between complete individual freedom and heavy centralized planning.”

“So, you’re trying to balance these different tendencies?”

“Exactly. I don’t know how long the middle will hold, but right now the majority of our population is moderate in opinions, and a lot of people listen to me, so I’ll try to keep them in the middle.”

“Which will get a lot of people angry at you.”

“That’s the price of being involved in government. I have enemies up here. We aren’t that polarized; not yet at least. I have critics and a few opponents.”

“And a lot of people waiting for you to retire!” added Ethel.

12

Public Acts

early April to early May 2067

The debate raged in Concord's cafeteria for three hours. Some persons declared themselves candidates for Commander and stated what they thought had to be done; others criticized the personalities or proposals of other candidates; others just stood to offer their views of what tasks should be accomplished. The day before, several hours had been absorbed settling the ground rules for the election.

And finally, with suppertime looming, it was time to vote. Several candidates who seemed to garner little support withdrew and endorsed other candidates, leave three. After hearing them speak one last time, Liz concluded she didn't like any of them. Paper ballots were passed out; an interesting anachronism, Liz thought, but the best way to ensure that recounts could be conducted. She closed her eyes and said a brief prayer before voting, as was the Bahá'í custom, then voted for someone else. Then she jumped up and headed for the counting table, because she was one of the three people everyone trusted to serve as tellers.

They received votes and checked off the voters, then counted while everyone else got supper ready, talking in quiet and formal tones. Liz watched the vote see-saw three ways among the three candidates, who proved very closely matched in numbers. They counted the piles of votes a second time to make sure. When they finished, everyone stopped chatting almost immediately.

"We have results," said Pierre Benet, chief teller. He held up the piece of paper to get everyone's attention, but it was hardly necessary. "All ninety-one voters have voted, and the results are as follows: Patrice Dumkowski, 35; Christina Andropoulos, 30; Marina Zinchenko, 25; and Gabor Horvath, 1."

Everyone started to murmur at once. Christina looked shocked; Patrice tried not to look too surprised or pleased; Marina looked down. "Speech! Speech!" exclaimed Gabor. Patrice nodded, then rose. Everyone grew quiet. For a moment Patrice said nothing as he looked around.

"We've had a difficult transition in the last six or seven months. Mercury has grown up; it now chooses its own commander. We now the face the challenge of pulling together, restoring our trust and confidence in each other, and moving this world forward. I plan to propose some changes to the Commission. For one, Mercury and Venus should have separate commissions; it once made sense for them to share one body, but we're now much larger than Venus and we no longer receive our crews via a gravity assist from that world. Second, the Mercury population needs to have a much larger role in planning, as is the norm with Ceres and Saturn and will soon be the norm for the Galileans. Third, with the declining costs for staffing and supplying this place, it has to grow; Mercury has a huge amount of science to do and it can send exports back to Earth. We need to make sure the nations of the Earth, rather than continuing to cut their support, make a long-term commitment to raise their subsidy of Mercury. These will be my priorities and I look forward to working with everyone, and especially with the Council, to make them a reality." He smiled. It was short, but encouraging.

"I want to make sure we have a recount," exclaimed Christina.

“We counted the ballots twice already,” replied Pierre.

“Still, I want a recount. This is too important to take a chance an error was made.”

“Fine,” replied Pierre, irritated. He looked at the other two tellers.

They sat and recounted quickly while everyone else lined up to get their food. The result was the same, as they knew it would be; it wasn’t hard to count ninety-one slips of paper. Then they joined the end of the food line. Mike had saved a place at the table for Liz; Pierre and Brenda Benet joined them, as did Ursula Grenander, the third teller, and her husband, Klaus Richter.

“I’m glad that’s over,” said Liz.

“It was tense in here,” agreed Pierre. “But now I sense some relief, even a bit of pride that we did it.”

“I do, too,” agreed Brenda. “The conversations seem more upbeat.”

“But there’s a lot of polarization,” said Liz.

“And Patrice was elected with only a third of the votes,” added Mike.

“It’s a weak mandate,” agreed Pierre. “We should have restricted the vote to two candidates, or had a runoff between the two highest vote-getters.”

“Next time,” suggested Ursula.

“If he’s Commander, he’s Commander,” said Liz. “People have to respect the position.”

“Not if sixty percent didn’t vote for him,” replied Ursula, shaking her head.

“This isn’t Mars,” added Pierre.

“You shouldn’t worry so much, hon,” admonished Mike. “Disagreements and a certain level of distrust are inevitable among any group of people. We’ll be fine.”

“I hope so,” replied Liz. “Because you can train people all you want, but if they don’t trust each other, they won’t work together well, and working together is what makes our survival possible. All the new fancy training techniques in the world aren’t as effective as simple trust. Sure, there is some distrust and friction present in any group of people, but we can’t afford the level one finds on Earth.”

“I agree with that,” exclaimed Pierre. “But I don’t think we’ll have that much distrust. We’ll have more than Mars—it’ll take a long time for this place to calm down enough to function that well—but not so much that it is fatal.”

“I hope that’s right,” added Brenda, eight months pregnant with their first child.

They continued eating in uneasy silence, everyone thinking their own thoughts about Mercury’s future. A minute later, before a new conversation began, Christina Andropoulos came along with a refilled glass of water. She spotted Marina Zinchenko at the table behind them and walked over.

“Marina, I wish you had bowed out. We split the opposition vote between us. I’d be commander right now otherwise.”

“I’m sorry that’s how it worked out, Christina. But we’re two votes on the Council.”

“I know. John said we could be sure he won’t be able to accomplish very much.”

“We’ll see about that, won’t we?” agreed Marina.

Andalus Square was fairly full for the firearms destruction ceremony. When Will arrived ten minutes before the scheduled start he was pleased to see a crowd rapidly forming in front of the Commonwealth Building. Many had brought their kids.

At exactly 3 p.m., Kent Bytown exited the Commonwealth Building. He was surrounded by a dozen uniformed constables who helped carry a small metal box. They brought it down five steps and stopped on the wide platform halfway down the stairs. They stopped next to a podium and Will walked over.

"Good afternoon, friends," he began. "Over the last three months we have had a lengthy public debate about the presence of firearms on Mars. The debate has raised the bigger issue of the society we want to build here. In many ways, the issues are eternal ones: what are the rights of the individual versus the rights of the community? How many core values does a society need to survive and flourish? How does a society determine the core values it will embody? What shape will the debate about the values take, and what limits will be set on the debate?

"We arrived on Mars with thousands of years of debates about these issues already in our heads. They were different debates, occurring in different languages, based on different religious and cultural premises. For over three decades we have debated our values in cafeterias and restaurants, in our offices and labs, in conestogas and over the radio in pressure suits. The consensus constantly changes, develops, and reconsiders. This is the future of our society, for we are a multicultural, and therefore a multi-values society.

"But a core of values has emerged, expressed in our Constitution, our government budget, and our built environment. These values are a Marsian middle way that can accommodate the atheist and the Muslim, the Buddhist and the Catholic, the agnostic and the Hindu, the evangelical and the Bahá'í. These values maximize personal freedom in private matters in order to allow cultural and religious expression, and maximize

creativity in order to maximize our innovation and productivity. They limit some of our usual modes of conflict in order to reduce tensions and maximize mutual trust. They build a basic social support structure to prevent poverty and save us from massive financial losses. The system currently is buttressed by huge export incomes that reduce tensions over our priorities; let us be thankful of that, and mindful.

"Among the values we have debated is the role of coercive force in enforcing society's laws and social order. These firearms were imported to protect us, not oppress us. But the question was legitimately raised whether, at this stage, firearms are necessary. We are an orderly society; one with little crime; one endangered by the discharge of firearms inside pressurized enclosures; one with virtually no danger from terrorism. The debate was a fair and open one with the minimum of rhetorical tricks and distracting side issues. And the result was a consensus—not unanimity—that at the moment, firearms are not necessary. Perhaps when we have tens of thousands, hundreds of thousands, millions of Marsians, firearms will be necessary. The need to use nonlethal force already exists and the Commonwealth is importing nonlethal arms on the next flight to fill that need. But it is up to all of us—to our schools, our faith communities, and our neighborly efforts to assist each other—to postpone the sol when new firearms must be imported. Perhaps we can postpone that event indefinitely and a Marsian society can be built that will grow less violent as it grows larger and more important.

"This sol we are here to destroy the three firearms we have." Will turned to Kent. "Please place the pistols on the platform."

Kent nodded and pulled out the guns. He placed them, one by one, on a concrete block. A low plexiglass wall surrounded the block to keep debris from flying around.

Will picked up a sledgehammer that had been rested behind the podium. He held it up. “Yoshiyaki and Father Greg, will you do the honors?”

The Zen abbot and Catholic priest rose and came up to the platform. Will handed the sledgehammer to Yoshi, who took it and swung it with remarkable force at the first gun, smashing it into pieces. A great cheer rose from the crowd. Then Yoshi handed the sledgehammer to Greg, who smashed a second gun. Cheers rose again.

Will took the sledgehammer and smashed the third gun into several pieces with one blow. Then he reached down and took a small piece. “Take a small piece,” he urged Yoshi and Greg, so they reached down and did the same.

Then Will raised the sledgehammer. “Everyone who wishes can come forward to smash the guns and take a piece,” he said. He handed the sledgehammer to a reluctant Kent, so that the chief constable would be the first in line. A line formed and soon the guns were broken up and the pieces were gone.

Will saw a woman in the front crying. She had just taken a swing and was holding a small piece of the handle. “Why are you crying?” he asked.

“Because I never thought I’d see the day when something like this could happen,” she replied, between sobs.

“Let us hope it will never have to be repeated,” he replied. His tone startled her.

“Will, what about the bullets?” asked Greg.

“They can’t be smashed in a public ceremony, but they will be incinerated. Kent is arranging that; he’ll contact you to witness it.”

The *Piazzi's* solid-core nuclear engines fired for twenty minutes in order to inject the caravel into a low orbit around Ceres. On the bridge, Helmut watched everything with great care as the ship's pilot and copilot monitored the two nukes and the flow of hydrogen through them. Everyone had to remain strapped into their chairs because the one tenth gee of acceleration was perpendicular to the floor; it was a strange experience to look around and see a wall as "down."

Finally, the two engines shut down and the flow of hydrogen through them waned as excess heat was removed. Helmut watched the pocked, orange-gray surface of Ceres rolling by on the view screen in front of them: it was so familiar, and it was so good to be back. It made him happy.

The floor felt like a floor again. Ken Leonard, the pilot, turned to Helmut. "The burn is concluded. We are in orbit."

"And the *Olbers*?" Helmut glanced at the monitor filled with information from the other caravel.

"Nominal," replied Clara, who had been following the other ship.

"Excellent." Helmut pushed a series of icons on a screen in front of him. "Attention all members of the Ceres settlement," he said, his voice booming through the ships' public address systems. "Welcome to our new home on the solar system's smallest planet. Both caravels are now in orbit. The burns were flawless. According to the plan, the *Piazzi* will descend to the surface in six hours while the *Olbers* rendezvous with the cargo vehicle and takes on cargo for landing. With two cargo vehicles waiting for us and two more arriving in the next three months, we've got a lot of work ahead of us.

"We've given the date of May first a whole new historical event. Our arrival will go down in history as the first wave of settlement of the Asteroid Belt. Just as the ancient Greeks sent out colonies all over the Mediterranean, perpetuating their culture and ways, this is the first wave of a Marsian expansion, the first settlement it has sent out. You've done very well on the long flight; I'm proud of all of us and everything we've already accomplished. We can look forward to some exciting times ahead and a lot of hard work. Thanks for everything you've already done."

Helmut closed the line. "The solar system's smallest planet?" Clara said.

"Ceres was a 'minor planet' and with us here, it's graduated to a planet."

"An interesting marketing plan," commented Ken Leonard. "Detaching the nukes in twelve seconds." Helmut nodded and turned toward a screen that showed the countdown. When it reached zero they heard a clang through the hull and a screen showed the two nuclear engines—attached to a thirty-meter truss, which was surrounded by hydrogen tanks—moving away from the caravel. After firing, the nukes were extremely radioactive; it would be a year before they had cooled down enough for a caravel, protected by full fuel tanks, to rendezvous and reuse them.

"The *Olbers'* nukes have separated as well," announced Clara. She pushed a button and one of the wall screens showed the engines moving away.

"Okay folks, six hours to landing," said Helmut. "Are we ready?"

Adam Haddad, who was monitoring the ship's systems, nodded. "I think we can get the Outpost set up in three months. At that point the drill arrives and we can start our exploration of the asteroid's interior."

"And the ataxite refining," added Lin Chen, who was in charge of eventual extraction of platinum-group metals. "We've got money to make."

"We won't cover our own costs, but we'll help justify the mission," agreed Helmut. "Sophie, how long to set up the greenhouses?"

"I see no reason why we won't achieve our six-month goal. The mirror system should give the plants the light they need and all the soil from the last visit is available."

"It's a question of finding the human resources to get the work done," agreed Helmut. "We have our work cut out for us."

Five hours later, the Piazzi's chemical engines came alive for thirty seconds to burn off fifty meters per second of forward velocity. The vehicle's orbit was modified so that it would intersect with the surface of Ceres an hour later. As the vehicle approached Ceres the engines came on again for several minutes to burn off the remaining few hundred meters per second; the caravel continued its four revolutions per minute of spin and the floor appeared to tilt as centrifugal force competed against deceleration. Ken Leonard watched the computer very closely; it did the flying and followed the flight plan perfectly. With the slightest bump, the *Piazzi* landed on Ceres.

"We are down," announced Helmut over the public address system as the bridge erupted into applause. "Welcome to our new planet. Ground crew, prepare for deployment!" He said the last phrase with some excitement; a dozen crew had to deploy their surface vehicles and drive to the two cargo landers about five hundred meters way. The landers had brought nuclear reactors that had been deployed robotically two kilometers away; the caravel had to connect to them to obtain power.

He surveyed the bridge, asking for reports from everyone. The engines were shutting off normally. The *Olbers* was beginning its rendezvous with the first cargo capsule in orbit. Consumables were in good shape. Life support had not been affected adversely by the vibration or accelerations of the various burns. Their very complex and sometimes fickle equipment had performed well. In short, everything was nominal.

There was the rush of feet entering the bridge and Helmut looked up to see Charles and Oskar running in. Mom and dad were there; they had restrained themselves long enough. Helmut rose. “How did you guys do?”

“Fine,” replied Charles. He tousled Oskar’s hair. “He was nervous a few times.”

“I was not!” At age five, Oskar was not going to admit to any fear.

“Never mind.” Helmut embraced his younger son. “Do you want to see that we’re really on Ceres?”

Oskar nodded eagerly, so Helmut pulled a marble out of his pocket and put it on a smooth, uncarpeted part of the floor. It began to roll across the room.

“So, that’s Ceres gravity?” asked Oskar.

“That’s right. The ship’s rotation makes 0.4 gees, but toward the circular edge of the ship. Now that we’ve landed, Ceres is pulling on us at 0.04 gees, but toward the bottom of the ship instead of the edge. So all our floors are going to feel a little tilted from now on.”

Oskar smiled. “Cool!”

“Dad, is there any way I can go outside and help?” asked Charles.

Helmut looked at his surprisingly tall son, now 13 ½, his voice cracking from adolescence. “Do you realize you’re one of five people on board who’ve been here

before? That's pretty amazing. You'll get outside with me soon enough. But not today; there's too much to do and you don't have the skills."

"Dad, I can do it! Please!"

"No, Charles. No. In two years I think you will be helping outside with adult supervision, but don't try to grow up too fast. I'm not even sure I'm going outside today."

"When will I get outside?"

"Me too!" added Oskar.

"Charles, tomorrow or the next day; let things calm down a bit. Oskar: I want to take all the kids outside in a hopper van and I don't want to wait very long. You kids are residents of this new world, too, so you need to see it yourselves as soon as possible."

Oskar smiled and nodded; Charles looked away in frustration. Clara put her hand on his shoulder. "Come on, I'll walk you guys back to quarters."

"Alright, mom," he said reluctantly. He nodded a goodbye to his father and headed out of the bridge.

Helmut looked around. "The ground crew's suiting up?"

Adam. "Yes, four are preparing to exit underneath the vessel and eight are suiting up to exit the upper airlock."

"Good. Everything's normal, so I think I'll suit up and go outside as well."

Adam smiled. "Got to get your feet down on Ceres again?"

Helmut nodded. "Exactly."

13

Marsoforms

late June-early July 2067

The outer door of the airlock opened and the robotic ranger-taxi began to move forward from the Cochabamba transportation facility. It turned northward onto a smooth, newly paved road and accelerated toward the escarpment.

"When did they pave this?" asked Sridhar asked Ramesh, pointing to the eight-meter wide concrete surface.

"Three weeks ago. I don't know why it took so long; the Escarpment Highway has been paved over a year."

Sridhar pointed to a construction area. Large machines were installing and welding together prefabricated sheet-metal wall casings with built-in rebar; another machine would fill the casings with concrete. "Was there a proposal to move the road because of the addition to the plastic fabrication facility?"

"No. The industrial park is expanding northward. If they want to expand eastward they can tunnel under the road's fifty meter right of way."

"But there were hearings."

"Bureaucracy." Ramesh pointed to a huge enclosure going up west of the fabrication facility. "Now *that's* something I'm proud of: the Ukraine Low-Pressure Enclosure, three hundred meters by five hundred, polder to feed fifteen hundred people. It'll be finished in January, two months before the migrants arrive."

"How much cheaper?"

“Forty percent as expensive per square meter as fully pressurized farmland.”

“I was surprised they decided to put the entire agricultural expansion in one dome; rather risky.”

Ramesh shook his head. “Not really. We have so much farming and bioarchive space that if Ukraine didn’t come on line we’d just reallocate everything else.”

“It’s a big change, and good for agriculture.”

Ramesh changed the subject. “So, are you Commander of the second ship?”

“It’s still up in the air. It might be Johnny Lind. He’s got a lot of asteroid experience.”

“And you were number two on the moon! I’ve never liked Lind; he’s pushy. I’d push a bit, too, if I were you. Indians are the second largest group in the Saturn mission, after the Americans.”

“Ramesh, we don’t lobby for promotions in the Saturn Commission. The personnel decisions are routinized.”

Ramesh scowled. “When have personnel decisions ever been ‘routinized’?”

“It’s the only way to be fair in a multicultural setting; the rules for hiring and promotion must be clear. It’s the same as on Mars. We don’t do business the way Earth does.”

“I know.” Ramesh stared at the escarpment, which was now far too high to see through the ranger’s front window. He feasted on the flood of details. “This place needs a more effective opposition. So far, Elliott’s gotten almost everything he wants. That’s one example of how we don’t do things the same way as on Earth.”

"Ramesh, please! Do you want us to be like the U.S.? Here it is, sixteen and a half months before the 2068 Presidential election, and what do we have? A Fundamentalist minister and former actor running for President, he's an 'America-Firster,' wants to pull the U.S. out of all international treaties, to ban abortion for the third time, to set up strict standards for censoring movies and television, to make the United States energy independent with solar, wind, and nuclear power, to limit imports to thirty percent of the economy and decrease the amount to twenty percent in ten years, to build up the military big time and weaponize earth orbit. . . Knight was laughed at, the media ignored him, the Republican mainstream ignored him. . . then someone tried to assassinate him, managed to shoot him in the groin, he made all sorts of virility jokes and suddenly he looked like a decisive macho man, and as soon as he got out of the hospital he was favored by fifty-five percent of the public! The idiot will probably be elected the next President."

"And your point is what? The American public, after a half century of declining educational standards and literacy, gets its news from Hollywood gossip shows. Half the American public that reads has come to Mars. We can afford a lot more real debate without degenerating into contests focusing on the candidates' haircuts."

"Don't be so sure. The people I talk to say 'why is your cousin Ramesh so critical of Elliott all the time? Is he just trying to make a name for himself?' People consider your motives and don't like what they see." Sridhar turned to his cousin and looked at him intently. "Look, Ramesh. You aren't going to be elected Chief Minister. Never mind the arguments about the culture of choosing leaders here; let's look at it practically. The Speaker of the Council will probably be elected the next Chief Minister. The Mars Council members elect both positions, and your colleagues don't have a very high

opinion of you right now, from what I see. Furthermore, Lal's the Speaker, and how many Indians do you think they'll elect?"

"What sort of argument is that? After the Americans, we Indians are the most important group up here. There are more Chinese, but they haven't assimilated as well; we're English-speaking and our culture is more democratic. The Europeans and Latins are divided into all their nationalities, as usual. We can get a lot of Indians elected up here if we organize."

"Organize; an Indian party. Great."

"No, we can't get away with that, but we have a Temple and an Indian Association."

Sridhar shook his head. "I'll have to hurry back from Saturn and run against you, to save Mars from you."

Ramesh was hurt by that. "Come on. And. . . are you coming back?"

"I don't know. No one was supposed to stay *here.* Titan's at the practical limit of human habitation, assuming we settle there, but it's a world and we're arriving as a complete community. Maybe we'll stay." Sridhar looked at the canyon sides to the right and left of the ranger. The narrow stretch was coming to an end and the road tilted sharply upward to climb a landslide deposit. At the top they wound around a house-sized boulder and emerged onto a flat, wide spot in the canyon where Ramesh's development hove into view: one long thirty-five by seventy five meter bubble with five smaller housing bubbles around it. "So, when am I getting my investment in Canyon Meadows back? That's a reason to come back, all by itself."

“Patience. I’ve sold seven house lots and four have been built on. It’s a matter of time.”

“Which is another way of saying that a housing development in the middle nowhere is premature.”

“It’s not premature, marketing just hasn’t been effective yet. And this isn’t the middle of nowhere; it’s a great spot. With every house built, the other lots get easier to sell. We’re already planning another meadow enclosure. With two meadows and forty house lots around them we’ll have a community big enough for its own transportation.”

The taxi approached the garage, but a vehicle was already inside so it headed for a dock instead. Ramesh frowned. “Must be Kristoff. I need to talk to him.”

The taxi backed against the docking port and a tunnel extended outward against the back of the ranger. There was a series of clanks as the tunnel latched into place. As soon as the tunnel pressurized the two men rose from their seats, opened the hatch, and walked through, closing the hatches behind them. They entered Canyon Meadows. “This way; I have to talk to Kristoff first,” said Ramesh, much to Sridhar’s irritation, since he was looking forward to a highball at Ramesh’s bar before supper.

Ramesh led his cousin across the arrival area and out a door into the “meadow.” The thirty-five by seventy-five was planted in clover that was now lush and a half meter tall except where the kids had beaten it down. The air was cool, a reflection of the fact that the enclosure was now in the late afternoon shadow of the cliffs and the atmosphere was dusty from the beginning of dust storm season.

Kristoff was in a corner tinkering with the irrigation system. A hive buzzed next to him. “Kristoff, you haven’t given me an accounting of the honey production yet,” Ramesh began as they approached. Kristoff looked up patiently.

“Good sol, Ramesh. I haven’t harvested the honey. The clover’s doing pretty well so far in the reduced insolation, so I’ve postponed the harvest another week or two.”

“Why didn’t you tell me? An email would be quick and easy.”

“We’re settling up the accounts in September, so what’s your hurry? The price of animal feed is going up, as expected, so I’m postponing the clover harvest to August. The bees will have more time to make honey and this place will still have time for winter wheat; assuming you’ll let me fill this place with snow.”

“Sure, the kids will have fun with it. Winter wheat’s ugly, but we can handle it. I’m more concerned that you’re not informing me with what you’re doing with my land. It’s *my land*, Kristoff, not yours. Don’t forget that.”

“Ramesh, I told you my plans months ago, the only change is you’ll have pretty clover longer and ugly bare ground and wheat less, not to mention a bigger profit on clover and honey. I don’t need this hassle, Ramesh.”

“Well, you’re going to get a hassle from me until you treat me with respect!”

Kristoff snorted. “I see. I just sold my four farm domes at New Tokyo and used the proceeds to buy a third of Ukraine. I need the entire duststorm season to move topsoil down to Aurorae and set it up. So I literally don’t need the hassle of coming here, Ramesh, and after the season ends I’ll have no reason to be driving by; unless you’re nice to me, of course. But I see that’s not going to happen. Good luck after September, Ramesh. I’m sure you can find someone else to use this enclosure.” Kristoff turned to his

task and for a moment started to pick up his tools; then he changed his mind and went back to work.

Ramesh stood there, anger building. “If you feel that way, then get off my land!”

Kristoff looked up at him. “We have a contract until September, so I have a legal right to be here. If I don’t fix this system the clover will dry up and die, and if I leave and you don’t hire someone else to do it, I can sue you for destroying a crop I have legally planted on *your* land. Imagine what a court fight and coverage in *Mars This Sol* will do to your vote, come election sol. It might even raise me from sixth to third in the district.”

Ramesh’s face began to turn red, so Sridhar put a hand on his shoulder. “Come on, Sarah’s got supper ready.”

Ramesh looked at his cousin. “Okay.” He turned and they walked away.

Will was one of those rare people able to read budgets and inventories item by item. But it was a task he could accomplish well only early in the morning when he was fresh; later, fatigue and general impatience would set in. So when he heard a knock on the office door, his first reaction was irritation. A glance at the chronometer, however, told him that his appointment was on time. It was Lisa Kok, head of their agricultural outfit, Agmar; director of the Bioarchive Project; and chair of Martech’s Biology Department.

“Come in, Lisa,” he said. “Your usual tea?”

“Yes. I invited Jefferson along.”

Will’s face lit up. “It’s good to see you, Jefferson. Coffee or tea?”

“Oh, nothing, please.”

“No no, everyone drinks something; coffee, tea, or water. I’m having tea.”

“Okay, tea then.”

Will pulled out cups and poured tea. Jefferson Woolsey was African American, 26 years old, a newly minted Stanford PhD in plant genetics and ecology, and one of the brightest new additions to the bioarchive project. “How’s Serengeti?”

“Coming along very well!” replied Jefferson, who was in charge of it. “The ecology’s pretty well established. The termites were constantly dying out but now they’re spreading too fast; we have a lot of population fluctuation with insects and microorganisms. The lions are doing fine; did you hear about the monkey incident?”

“Yes, they were jumping so high in Martian gravity, they were plucking monkeys from the trees.”

“Exactly. We moved the monkeys out until the trees grow taller. The zebras and wildebeests are thriving and the flight next month is bringing an adolescent giraffe female and a dozen frozen embryos.”

“We’re getting complaints that people can’t walk inside the enclosure,” added Lisa. “They don’t appreciate the danger and complain an entire enclosure is dedicated to animals of little use to humans. It’s seen as a waste of money.”

“Of course; bioarchive has long been viewed as a waste,” agreed Will. “But they strengthen our ecological skills, we get fruits and herbs from them, they give us a place to put plant wastes and gray water, they diversify our sources of oxygen and fresh water, and they give us a wide range of ecological experiences, especially once the balcony trails along the two sides of Serengeti are finished. It’s the usual checklist.”

Will handed them cups of tea, then sat at the table. “We’re not here to talk about Serengeti, though,” said Lisa. “Jefferson has convinced me that we need to consider a new project: to create a Marsoform.”

“Marsoform?” said Will, startled. “You mean a life form that can live outside? I thought that was impossible.”

“Maybe not,” replied Jefferson. “We know the genomes of a lot of earth species and we know what genes control what plant functions. Do you want to hear the details?”

“Yes, absolutely!” Will leaned forward as Jefferson pulled out a pad of electronic paper. He pushed an icon and the image of a dark green, cactus-like elongated spheroid appeared on the surface. “This is what we think we can create in a decade or so. We’re calling it a ‘cactar’; ‘cactus’ plus an ‘-ar’ ending to indicate it’s a marsform. It’ll be based on a northern Mexican cactus and a central Asian succulent that already has good cold and drought tolerance, though we’ll strengthen that with ‘antifreeze’ genes from other species, including some Antarctic algae species. The tough exterior will be very dark, to absorb as much solar heat as possible, and will have pigmentation to protect the plant from ultraviolet; there are some pretty potent compounds in high-altitude species, and they can be improved. The exterior will have very few stoma, the pores plants have to obtain gasses from the outside atmosphere; it will have a few to get carbon dioxide, but they’ll open only when the exterior of the plant is below freezing. Otherwise the plant will lose too much water vapor. The center of the plant will be hollow and it’ll have stoma that stay open permanently there; some of the plant’s oxygen and water vapor will accumulate inside, providing the plant with an ongoing source. The cells will also make

and store hydrogen peroxide and an organic stabilizing compound, an excellent source of both water and oxygen."

"Very clever," said Will. "But where will the plant get water?"

"It'll have shallow roots that will be dark green, to maximize solar heating, and it'll 'weep' antifreeze to help melt ground ice near it. But usually we'll have to water them. In polar areas the daytime temperatures are too low for the plants to grow and ground ice to melt, and at the equator where the plants can get up to twenty centigrade during the day there's no water to extract from the ground. Besides, the plants will need to be fertilized. We can either spray a nutrient-water mix on the ground around the plant every few months or we can inject it straight into the hollow interior through a needle hole."

"At what temperatures will these plants grow?"

"The antifreeze will keep water inside them liquid to about twenty below zero centigrade, so they'll only grow a few hours every sol when the sun is high, but that's enough. The hollow interiors will also host various microorganisms that will help the plant by breaking down old plant tissue and fixing nitrogen."

"So, basically you're designing a little photosynthetic spacesuit."

Jefferson smiled. "Yeah, you could call it that."

"Reproduction?"

"They won't be able to flower and make seeds. The cylindrical stalk will get longer and longer, then the plant will grow a membrane across the middle to make two separated hollows and the connecting tissue will decay. The top half of the plant will fall off, the wind will blow it around, it'll set down roots, and grow in a new spot. We'll have

to help them; in current Martian conditions the new plants won't get established. Meanwhile, the old plant will grow longer and wider again and will divide again."

"How much will this Marsform cost?"

He gulped. "This isn't an easy or a quick project; it'll take fifty people a decade or twenty-five people two decades."

"A half billion redbacks," added Lisa.

"Wow." Will contemplated. "Advantages?"

"It's a step in terraforming," continued Jefferson. "Even if we thicken the atmosphere modestly and warm Mars slightly, these plants can spread around the planet and grow, releasing oxygen into the atmosphere. Let's say we increase the atmospheric pressure three-fold and ten percent of the CO_2 is converted to oxygen. Even a small amount of oxygen in the atmosphere would be very helpful; spacesuits, vehicles, and habitats could extract it."

"I suppose we can genetically modify other species and create ecologies."

"Eventually. This will not be a genetically modified species, by the way; it will be the first species created by human beings. The genome will be distinctively different from the starting species. It will not be able to reproduce with the original."

"Not if it reproduces by budding," agreed Will. "Are you sure this will work? What if the antifreeze genes you add are incompatible with the ultraviolet pigment genes, or what if one of them produces an intermediary chemical that blocks a vital chemical pathway in the cellular machinery?"

"We never said this would be easy; that's why it'll take twenty-five to fifty million redbacks per year. Additional Marsoform species will be cheaper."

Will nodded. “Lisa, you already know your staffing levels and equipment for the next year. The equipment is on the way via solar sailer and the passenger rosters for the upcoming flights are finalized. So you’ll have to reallocate your own resources for this project. There are still a dozen slots on Mercury 2, so you have a shot at hiring more people in early 2069 if you move fast. You also have two years to make enough progress to justify a major expenditure of resources.”

Lisa looked at Jefferson with an I-told-you-so look. “Even though I’m getting a thirty percent increase in staffing and even though they’re all allocated to existing projects, I’m willing to make a big commitment to this, because it’ll fire the imagination. This is a potential revolution. We need to consider seriously committing extra resources, even thought they are hard to find.”

“You may be right about that, but I want progress with existing resources first.”

Lisa shrugged. “Okay.”

“You need to talk to Jacaranda Nuri, also.” Will looked at his attaché. “Make a note of that, Anisa.”

“Isn’t publicity premature?” asked Lisa.

Will shook his head. “If you’re planning to set up a team of even two or three people to explore this—let alone a bigger operation—then there are two ways the public can find out about it: we can tell them and control the release, or it leaks and we react.”

“Do you think this will be controversial?” asked Jefferson.

“What do you think? It is very significant research, so the Marsian public should be fascinated and will debate about it a lot. How controversial it will be, I don’t know. There seems to be a consensus on Mars that terraforming that simply flips the planet into

an estival phase is fine. The last big estival, a hundred million years ago, appears to have involved an atmosphere of fifty millibars of CO_2 and a planetary mean temperature of minus fifteen, plus some running water and a lot of equatorial ice. We know Martian life forms can thrive in those conditions. During the smaller estivals in the last sixty million years they've had competition from feral microorganisms from Earth; maybe during earlier estivals as well, if the evidence of earlier contaminations can be trusted. So an estival of that size coupled with escaped terrestrial bacteria from our habitations is probably alright. But you're talking about releasing maybe two or three millibars of oxygen as well, and that's almost enough to poison Martian microorganisms. Furthermore, once we release a terrestrial ecology suitable for Martian conditions, we can't control it. It could make ten millibars of oxygen when we wanted three. That could push Martian life into extinction in the wild, except maybe in the caldera of Olympus Mons. That would be controversial, don't you think?"

Jefferson nodded. "We're playing God. It has serious ethical implications."

"Exactly. We will have to learn to control this planet's climate. I'm sure we will modify it, at least to flip the planet into a sustained estival. Humanity has to learn how to control the Earth's climate; sea level's already up half a meter. What we do up here has important implications for Earth. That means we can get grant money."

"Where should we put this project?" asked Lisa. "It doesn't fit horticulture, bioarchive, or Martian biological research."

Will considered. "It'll have to have its own department. I suggest we put it at Martech under the Biology Department. That will make it public, peer reviewed, published research. It'll attract research grants. You have faculty status, right Jefferson?"

He nodded. “Yes, just like two thirds of the adults up here. I’ve never taught a course, but I have served on a dissertation committee.”

“Here’s your opportunity to be a full-time professor of biology, though with little or no teaching load. That’d be my recommendation.”

“Okay,” said Lisa. She looked at Jefferson. “I think that’s it.”

He nodded. “Thanks. This is quite exciting. I was hoping we could get started right away, and it looks like that’ll be possible.”

“It’ll be a small start, but if the results are good, it’ll grow.” Will rose, so Lisa and Jefferson did as well. “Thanks for coming,” he said. He shook hands with both of them and escorted them to the door.

After they left he sat facing the window, out of which he could see the western end of the escarpment. Marsoforms. He tried to imagine the rolling landscape around the outpost covered with small cactus-like plants. They might even be able to grow unassisted there; Aurorae lost so much water vapor, the area had frost every night. They were already terraforming Mars.

He turned to his messages. They were mostly reports, of which he received a dozen a sol. Before he was able to finish them, Ethel arrived.

“You’re early.”

“No dear, I’m late; it’s 11:45 already.” She walked over and they kissed. “How was your morning?”

“Not bad. The highlight was the meeting I just had with Lisa Kok and Jefferson Woolsey. Jefferson thinks he can genetically engineer a cactus to survive on Mars.”

“Outside?”

“Yes, out on the range. It’ll store water and oxygen in its hollow middle, where a robot will have to inject water occasionally. It’ll grow a uv-resistant coat and reproduce by budding. I’m still reeling; I’m not sure we want Mars covered with Marsoforms.”

“I wonder what the Marsian public will think; some will be fascinated and some furious. Same for the terrestrial public. I wish I had such an interesting report to study this sol. I’m struggling to maintain staffing levels.”

“Everyone’s bailing out in anticipation of the new arrivals.”

“In nine months!”

“That’s always the way it is.”

“I had to say no to someone who desperately wants a transfer to Aurorae from Uzboi in order to get married, but we have no replacement for her. At least platinum production is pretty much on quota and the price is good. How’s the galleon and the new Mars shuttle?”

“The second galleon is flying from Phobos to Deimos on a practice run. We’ll have one ready to fly to Earth via Mercury early next year. And it looks like the maiden flight of our first shuttle is only three years away.”

“Not bad. Did you watch the message from Liz?”

“No, but I saw it had arrived. How’s she doing?”

“She’s discouraged. The opposition’s making life difficult for Patrice whenever they can. She and Mike—he’s getting upset, too—just had a private breakfast with Christina and John in order to figure them out and dissuade them. She says they’ll oppose everyone until one of them is elected Commander.”

“She’s probably right. We’ve all seen that type of personality; they can make an incredible amount of trouble. If I were Commissioner I’d thank them for their service on Mercury and invite them back to Earth. They don’t have kids.”

“That may be best, but the new Commissioner doesn’t have information.”

“Sure he does; everyone on Mercury. Choudhury should video mail each one personally and ask for their impressions. He must know someone whom he trusts. I’ll videomail him about the situation and make the suggestion.”

“Good. It’s quite a contract with Ceres, isn’t it?”

“Yes; they elected Helmut peacefully on the second ballot. But that team was carefully picked and they trained together. They don’t have oppositional personalities and they trust each other.”

“Liz also said she saw Mike reading Bahá'í scripture on his attaché. The disunity up there has made him think about our concepts of unity.”

“Really? Interesting. He’s a good man. I’d be happy if he became a Bahá'í.”

14

Ambassadors

Sept. 2067

It was strange to see an American flag fluttering over Andalus Square. It flew from the newly-opened United States Embassy, which occupied the western end of the building forming the southern side of the Square. When Will stepped out of the Commonwealth Building, he had to walk only forty meters to enter the embassy.

The embassy's ground floor entrance was grand, but the interior was small. The door led to a compact reception area that opened into an elegant salon twenty meters wide and ten long. It had a six meter ceiling--the building's old second story had been removed to make it more grand—and off-white walls with fake stucco moldings. The salon had great food and the invited crowd was building fast. Will stopped at the hors d'oeuvres and filled up a plate—a very nice, imported porcelain plate—with stuffed mushrooms, tiny sandwiches, and various puffy pastries he had never seen on Mars before. He skipped the wide variety of imported California wines and grabbed a glass of mineral water. Then he headed for the host, Ambassador Brian Stark.

"Brian, this is really nice."

"Thanks, Will. A bit smaller than I'd like, but we can have 100 people for a state dinner and I doubt we'll need more than that for a while. People have suggested we rent it out for functions! We might make it available to U.S. citizens. We'll probably want to move the U.S. Pavilion during Equinox so that it's set up right outside our door."

"That makes sense. You're the first embassy; it makes me proud, as an American, to see the U.S. demonstrate its commitment to this place this way."

"Hey, that's my line!"

"I heard you on *Mars This Sol.*"

Brian laughed. "Oh. But it's true. It helps that New Hanford is here. The Indian and Chinese embassies open after the ambassadors arrive next week; I was already here and I had all the contacts with the construction people."

"What's upstairs?"

"I'll give tours in a little while. The next two stories have offices and meeting rooms and the top story is my apartment and office. It's pretty simple."

"Staff?"

"One full timer. I'm here three mornings a week because of my duties at New Hanford. But I'm getting the diplomatic briefings; they're very interesting."

"Any insights into the politics down there?"

"Not from the briefings, but I'm in touch with a lot of people. Vice President Knight is really becoming popular; he'll be hard to beat next year. There's a huge conservative segment to the U.S. population and he's figured out how to woo them, not to mention a lot of middle-of-the-road voters."

"He's a real talker, that's for sure, and he comes off as down-to-earth. Or maybe I should say down-to-America, since he hates international stuff!"

"He does; he's an isolationist. If he gets elected, it's going to cause a big mess and a lot of pain in the U.S. But I've been watching politics long enough to know that it's all temporary; the pendulum swings one way, then a decade or two later the other."

“That’s true, but the swings cause real havoc.”

“I agree, they do; you can reverse dozens of major social conventions and government policies only so many times. And this will be the first twenty billion dollar presidential campaign. So, is Ethel coming tonight?”

“To the opening banquet? Yes. Have you alerted the catering staff I’ll be offering my toast with mineral water?”

“Yes. I’ll be toasting with it as well.” Brian held up his glass.

Will was surprised. “You’re a tea totaler now?”

“I sure am.” Brian lowered his voice. “Will, I was getting drunk almost every sol until a few months ago. But now I’m trying to stay sober, one sol at a time, thanks to some help.”

“Brian, I had no idea.”

“Very few people knew. It was a gradual thing; in the last few years, liquor’s been getting easier and easier to obtain. I had a drinking problem as a young man and when I came to Mars it went away because booze was almost impossible to obtain. But then I got pot and was smoking that. When I got rid of the pot I started drinking a lot more.”

“I noticed you had put on weight.”

“I gained fifteen kilos! I needed a new pressure suit twice. But now it’s coming back down. If you ever want to come to an open meeting of Alcoholics Anonymous, let me know. We meet every Tuesol evening at the hospital.”

“Thanks for the invitation. I heard we had an A.A. group; more evidence how big Marsian society’s getting.”

“Yes. You may need to reconsider the alcohol consumption regulations soon; they may not be working. But I suppose that’ll exacerbate other social tensions.”

“It might. I have a meeting with Father Greg and Yoshiyaki Suzuki tomorrow and I’m sure I’ll hear complaints from them about various things. I suspect they don’t see eye-to-eye about alcohol, though. By the way, I have to leave this reception early; I have an appointment.”

“Oh, thanks for letting me know.” He pointed to General Zhou. “Qisheng just arrived, so I’d better go greet him.”

Will nodded and turned away while Brian headed over to China’s chief envoy. He ate a few more hors d’oeuvres, then joined a conversation. At 4:25 he put his plate down and hurried back to his office for his appointment with Michiko Suzuki, their chief meteorologist.

“Michiko, I have just the tea for you; green tea from the monastery,” he said as he led her into the office.

“Thank you, it’s my favorite. I don’t like marjeeling.” Michiko sat while the boss poured hot water into a fresh tea pot and added leaves.

“How’s Yuki?”

“Settling into her new job on Phobos.”

“Phobos? What took her there?”

“She graduated from Martech in June! She’s twenty-two. She’s got a Bachelor’s degree in horticulture and she’s up there running five thirty-five by seventy-fives, growing rice for export to the moon.”

“Really? Time flies. Katsuya must be starting Martech this fall, then.”

“Exactly, and he wants to be a physician just like Shinji, so he plans to fly back to Earth for medical school. I’m heartbroken.”

“He’ll be back. Maybe he can help open our first medical school in a decade.” Will handed her a cup of tea and sat. “So, what’s up? A late category five?”

“No. The long term forecast has stayed the same: unusually weak high-altitude winds and vigorous surface circulation across the southern hemisphere will dissipate the boundary layer of warmed air right above the ground, disrupt dust devil formation, and prevent dust storms.”

“We haven’t had anything this dust storm season.”

“Not even category 1! We haven’t seen that in over twenty years. This season might not have big regional storms. Better than average conditions for agriculture, solar power production, and shuttle flights should persist.”

“Sounds like the forty tourists arriving next month will have a good time.”

“Yes, they gambled and won. The exception is the south polar station, and that’s why I wanted to stop by. I doubt they’ll be able to fly there. It’s experiencing an unusually vigorous sublimation of the dry ice cap, so surface winds are very strong in the polar region. The atmosphere overall is gaining 0.02 millibars of pressure; it doesn’t sound like much, but it’s a huge increase in one annum. We’re heading toward a mild estival in about ten thousand years.”

“Is this something a mild release of greenhouse gasses will enhance?”

“Most likely. But that’s premature, I suppose.”

“It’s not something we can tackle yet. But if we had fifty thousand people we could afford to dedicate a thousand workers to terraforming.”

"It'd be controversial, but the Marsoform project seems to have gone over well so far. I'm thrilled at the prospect of terraformation. Admittedly, the result may be some pretty bad weather; dust storms would be much worse and the winds more damaging. But if we get more water circulating in the atmosphere the dust levels could drop. The Department of Meteorology and Climate at Martech is initiating a study of efforts that could hasten the next estival. We should have a report in a few months."

Will shrugged. "Good, but don't count on me to inaugurate something unless it's small enough to fit our existing resources. Our resources are pretty stretched."

"I know." Michiko rose from her seat and extended her hand. "Thanks for the time. *Mars This Sol* already knows about the forecast of an estival and will do a story about it tomorrow."

"Great," said Will.

A week later, during the first days of September 2067, two caravels from Earth reached Mars and two caravels from Mars reached Earth. Just as the first shuttle with passengers from Earth was about to land at Aurorae, Will received an emergency call from Foreign Minister Peter Theodoulos and Ambassador Islami. They looked worried.

"Will, we just received a videocall from American Secretary of State Hatch," Pete began. "It was a pleasant welcome to the vicinity of Earth, but it was urgent and angry in its own way. We've just transferred from the caravel to a shuttle bound for the Bermuda International Spaceport; a nice, neutral place in the middle of the Atlantic. We land in about twelve hours. Hatch insists that both of us go straight to Washington. Right now that's Ruhullah's destination, while I head for Brussels. I protested that our plans were

already set but he replied that they were unacceptable, since I outrank Ambassador Ruhullah and the United States is not only the leading world power, but the leading state behind the settlement of Mars. We've been blind sided. We're in an awkward position; anything we do will trigger a diplomatic incident. I suspect this has to do with Presidential politics; Vice President Knight has been complaining the White House has refused to fight for America's proper place in the world. I'm about to call Brussels to see whether my trip there can be delayed, but that will be extremely awkward and will cause a rift with the Europeans. I thought we'd better let you know and seek your input. Bye."

Will stared at the screen and shook his head. Petty politics was always the worst part of his job. He considered the problem for a minute, then hit reply. "Thanks for calling, Pete. Can you accidentally delay your trip to Europe so that our Ambassador gets to do the first official diplomatic initiative? He's going to Washington; later you do the second major diplomatic initiative in Brussels. That would balance out the importance of the two. Is there any possibility someone in your family in Toronto or Athens can be said to be sick, so you have to hurry home first rather than go to Brussels? Go to Toronto for a few days to visit your dear sweet mother, for example. Let me know whether you think that will work. Bye."

He sent the message and turned to other tasks in his office. He glanced at his attaché to make sure the shuttle flight from Phobos with the first arrivals from Earth was going well; so far it was. He read a report from Tithonium Outpost, where construction was delayed for a most unexpected reason: the weather had been so good, Aurorae had a smaller surplus of agricultural workers who could be switched to construction, so Tithonium had not received all the staffing expected. Will promised to find six more

construction specialists for the effort. Then Pete's reply arrived; Mars and Earth were almost at opposition, so round trip communication took only eight minutes.

"Thanks Will, that might work. I don't know why I didn't think of it. I do want to see my aged mom and dad in their nursing home! I'll call and see what excuse I can find to rush there first and then will apologize to the Foreign Ministers in Brussels. It's a perfect reason for Ruhullah to go to Washington without me, but at least I'll be on North America. Bye."

"Great, Pete. Good luck to both of you. Bye." Will sent his message, both relieved that the problem was solved and irritated that Theodoulos, who had considerable experience, hadn't anticipated the problem in the first place.

An hour later the shuttle *Kasei* blazed through the Martian atmosphere, activated its engines, and landed softly on a hundred meters of methane flame. It carried fifty passengers, including forty tourists and the Ambassadors from China, India, and the European Union. Will stood in Andalus Square to greet the mobilhab bearing them into Aurorae Outpost. The passengers departed from the vehicle in protocol order, the three Ambassadors coming off first, the Chinese in the lead. "Ambassador Zhao," said Will, extending his hand. "Welcome to Mars. We're very pleased to have you here. Your contributions to the study of Chinese language and culture have been very distinguished and we're delighted you plan to teach at Martech."

"Thank you, Chief Minister Elliott," replied Dr. Zhao Tao. He was a fairly tall man in his late thirties and was accompanied by a younger woman dressed very fashionably. He bowed slightly to shake Will's hand. "We are delighted to be able to

expand Martech's fields of study; no doubt Chinese culture will eventually assume great importance in the university's curriculum. Allow me to introduce my wife, Puilan."

They shook hands. "Pleased to meet you. You'll be teaching at Martech as well."

"Yes, also in Chinese, and I'll help run the embassy. I'm honored to meet you, Mr. Chief Minister."

"I'm looking forward to our appointment tomorrow," added Zhao Tao.

Will nodded. He could not say the same; Zhao had already sent a long list of demands for more land around the Chinese nuclear facility at Dawes, more access to the southern third of Deimos, and a better deal for Chinese reactors and reactor fuel. "It will be the start of a long relationship, I'm sure."

The Zhaos stepped forward and Ambassador Shiva Ramnath approached. She wore a beautiful sari of green and gold that complemented her attractive figure. They shook hands. "Ambassador Ramnath, welcome to Mars. Our relationship with India has been a remarkably strong one and grows every year. We are delighted India has sent an ambassador."

"Thank you, Chief Minister Will. And can call me Ambassador Shiva; I like the Marsian custom. I can't tell you how delighted I am to be here and to see you again; you may recall we met during your visit to New Delhi. I already have a list of twenty initiatives and some are already underway."

"I've heard about the technological contacts you've made for us at several Indian universities and the cultural programs you're planning. Everyone is pleased by and grateful for your efforts." Ramnath was a professional diplomat with considerable space experience and planned to do her job full time.

“I’m delighted. India wants a relationship with Mars that is strong and deep. We are an emerging superpower. I’m looking forward to collaborating with you.”

“Excellent.” She wanted an Indian mission to Jupiter; he hoped it would depart from Mars. He nodded to her as she moved on and Ambassador Mariella Fsadni, 39, Maltese, stepped up to shake his hand.

“Welcome to Mars, Ambassador Fsadni. The European Union has long been one of our closest collaborators and leading partners in trade. We’re honored that you’ve come and look forward to your many contributions.”

“Thank you, Mr. Chief Minister. I will also be representing the Grand Union and all its members except those with consulates, such as Japan, Russia, and Brazil.”

“So I understand. And you agreed to teach economics at Martech.”

“Just one course a year, but I’m glad to have the chance to retain my academic status. I’m very interested in your efforts to develop small and mid-sized businesses. The E.U. is ready to provide advice and assistance with the effort.”

“Excellent, we could use both. I’m sorry work on your Embassy hasn’t started yet; I understand there have been contractual issues. I hope they are resolved.”

She glanced at the American flag flying over the U.S. embassy fifty meters away. “Well, now that I’m here, I’m sure they can be swiftly. The price of real estate in Andalus has gone up quite a bit! I suppose that’s good for you, but hard on us. I look forward to more discussions.”

“Thank you.” Will bowed slightly and she moved on as well. The three ambassadors were as he had expected: a tough negotiator, a planner and initiator, and a slightly absent-minded academic.

He had studied photographs of the tourists and their profiles and recognized two thirds of them. He knew the first man, an entrepreneur who had made his fortune in genetic medicine. He extended his hand. “Dr. Carl Bono, welcome to Mars.”

“Delighted to be here and see this world, even if it is just a month. You’ve got some interesting medical researchers, too; looking forward to meeting them.”

“They’re interested in your expertise as well.”

“I’ll offer what I can.” He leaned over close. “And watch those ambassadors; they’re all spies,” he whispered.

Will smiled and nodded ever so slightly. That wasn’t news to him.

15

Central

Nov. 2067

Charlie Langlais looked at his dad. “I’m amazed the cliff has so much exposed ice!” Charlie and Helmut were standing on the floor of a crater a hundred meters in diameter, staring at a steep section of inner rim that was dirty-white.

Helmut nodded patiently at his son and made sure the boy could see his face through their helmet visors. “It makes sense. This is a comparatively fresh crater; just a few million years old. This slope gets very weak sunlight or none at all; not enough to sublimate much ice. The ice never gets above minus 150 centigrade or so. It can last a long time at that temperature.”

“So, this environment is a transition between, say, the Martian poles where ice is temporarily stable and Callisto, where it’s permanently stable in full sun.”

“Exactly. This slope probably gets about as much sun as Callisto’s surface.” Helmut smiled; he was very pleased that his son was figuring out so much. “You know, you have a knack for this. You aren’t even fourteen and you’re getting it.”

“Well, I’ll be fourteen in a matter of a few sols, and we’ve been covering Ceres geology in class a lot.”

“True.” Helmut reached down and picked up a shiny sample. “What’s this?”

Charles took it. “Nickel-iron meteorite. The lamination is typical of our ataxite impact.”

“Very good. So, do you have enough information to write up this field trip?”

“I think so, but do we have to go in?”

“I’ve got a meeting.”

“Oh, another meeting.” Charlie rolled his eyes. “My feet are getting cold anyway.”

“There’s something wrong with your boot heaters,” said Helmut. “When we get back, we’ll ask Lin to check them. Let’s go back.”

Charlie nodded. He looked up and gauged the jump out of the crater. He leaped and his backback’s stabilizer jets came on, boosting him up as well. He went up over the twenty-five meter rim and landed safely on his feet.

Helmut followed and did equally well. In Ceres gravity, one twenty-fifth that of Earth’s, a human could usually leap about twenty vertical meters. Charlie had adjusted to it very fast.

The two of them began to lope back to the outpost a kilometer away using a sort of leap that didn’t go very high, but carried them five meters forward at a time. Occasionally their backpack thrusters, sensing too much lean forward or backward, came on to keep their backs upright, but that happened rarely. When their feet touched down they immediately pushed themselves off again, launching into another five-meter lope.

“Dad, I want some sort of after-school job. If I can’t go outside, at least let me work in the greenhouses. The ships are too confining.”

“The little kids have cabin fever,” agreed Helmut. They had been on Ceres almost five months; it was now early November 2067. “I don’t want you working outside in a spacesuit. Even if they’re highly automated and reliable, you’re still too young to use one unsupervised. But a greenhouse will be fine. The crew needs all the help it can get.”

“I know; they want four set up by January! And that’s something I can do. I’ll be better than a robot, believe me.”

“I believe you. I’ll talk to Sophie.”

“Thanks!”

Helmut looked at the horizon ahead of them rather than at his son so he could consider the wisdom of his decision. He didn’t want to indulge his son’s desire to grow up as fast as possible. It was a dangerous expression of love and trust in a hostile environment.

The next lope carried them over a low roll in Piazzi crater’s floor and they could now see the outpost. It consisted of the two caravels on an east-west line and connected by a one-hundred meter pressure tunnel. Both were almost hidden under large plastic tanks filled with ice for radiation shielding. The tunnel also connected to two spacesuit donning facilities, a half completed garage for their vehicles on the south side of the tunnel, and two greenhouses on the north side, with two more slowly inflating. Two kilometers to the east were two empty cargo shuttles. Between them and the caravels were two small mounds covering 1.5-megawatt power reactors that provided the outpost with its electricity and heat.

A few minutes of loping brought them to the space suit donning facility next to the *Piazzi.* They entered through the airlock and made their way to the men’s locker room to strip off their suits and put on their inside clothes. Helmut was in his office ten minutes before the meeting. When he walked down the hall to the meeting room, Adam Haddad, Sophie Chen, and Juliette Delafontaine—the three members of the Ceres Council—waited. The voters of the expedition had elected the number two and number three in the

line of command to the Council—Adam, the director of construction, and Sophie, director of life support and horticulture—and the mission physician, Juliette, so Helmut met with the Council often to discuss everything pertaining to their mission.

"Good afternoon," he said as he entered. He sat. "I have two items. Any reports?"

"First, a question," asked Adam. "Any idea how the change in the American presidency will effect us?"

Helmut chuckled. Two days earlier, the President, who had terminal cancer, had resigned in favor of Vice President Knight. "Knight is no friend of space exploration, unless it's led by the Americans and done for the glory of the U.S.A. I'd start calling your contacts in Lebanon and ask them whether they want to help plug a two hundred million dollar funding hole."

Adam laughed. "I bet I could obtain a few million."

"Then do it."

"I suspect I had better not try the same," added Sophie, who was Taiwanese. "But maybe some private industries would be willing to donate."

"Ask. Juliette, are the French tapped out?"

"The French are never out of money if national prestige is involved," she replied. "I'll see whether I can invoke national prestige."

"We'd better be in touch with the Commission first, though," added Helmut. "They do the fundraising, not us, though our personal prestige can help."

"There's not much prestige left to being an astronaut," replied Juliette. "There are too many of us exploring too many places."

"Adam, where does construction stand?"

“We should be able to open and close the garage’s exterior doors in a few days; I think we’ve fixed the bugs in the motors and software. Soon we can bring vehicles inside. We’re also inflating the other two greenhouses. It’ll take about ten sols to set up the flooring and plumbing in each, and then they’ll be ready to receive regolith.”

“And we’re processing reg as fast as we can,” added Sophie. “We’ll have a hundred tonnes ready in three weeks when we can start filling them. The mechanical problems with the sifter have slowed us down a bit, and the water shortage has made it hard to rinse out the salts.”

“That’s about a quarter of the reg you need,” noted Helmut.

“We’ll have it all ready in three months. I don’t have enough equipment or staff to get them ready faster.”

“Could you use ten or twelve hours a week of help from a fourteen year old?”

“Charlie? Is he fourteen?”

“Monsol.”

She considered. “I suppose he has to stay inside. Yes, there are all sorts of jobs he could do; helping to spread reg, for example.”

“He could help with cleanup. Can he report to you on Tuesol?”

“Yes, starting Tuesol. As for my report: greenhouse one is about to harvest corn and rice, our first major crops, so we can expect fresh bread for the first time in three months. Greenhouse two has started producing fast crops; radishes and lettuce. The other two will be planted by January. We’ll start phasing out the onboard hydroponics in February so Adam can expand lab and housing space. All systems are nominal.”

“Good,” said Helmut. “The team that just came back from Demeter Planitia has completed a radiogenic dating of some samples and report that the basin indeed dates to 3.9 billion, as predicted, which makes it part of the terminal bombardment phase.”

“That firms up the impact chronology of the geologic units,” said Adam.

“Exactly. We couldn’t confirm Demeter’s age on the last visit, so it’s an important development.”

“Was that your other item?” asked Juliette.

“No; Charlie was a spontaneous addition. The exploration report was number one. To finish: next month a team heads for the north pole to core ice deposits using the new deep driller, so we can start work on a chronology of ice deposition there. In a year’s time we’ll be well on the way to study Ceres’s degassing history.”

“Number two?” asked Juliette.

“An idea for our Outpost naming committee. No one has liked any of the suggestions yet. ‘Ceres Outpost’ would be pretentious once a second outpost is established here, if another ever *is* established.”

“And there’s no pizzaz in Piazzi,” added Juliette. “ ‘Ataxa’ is too economic.”

“That’s why I wanted to suggest ‘Central.’ Central to Ceres, Central to the Asteroid Belt.”

“We always will be central,” agreed Adam. “With the ataxite deposit, this place has a secure economic base.”

“Exactly; it’ll probably always be the central settlement on Ceres, ‘the fifth rocky planet.’ And Ceres is central to the asteroid belt.”

“It’s a bit pretentious,” considered Juliette.

"There's a long history of pretentious place names," replied Helmut. "Greenland was definitely not green, especially relative to Iceland."

"That's true," she conceded. "A good name will carry you a long way."

"I like the idea," said Adam.

"I do too," agreed Sophie. "Let's recommend it to everyone at supper tonight."

Érico Lopes entered the main seating area of the Gallerie with a tray full of food. Carmen was right behind him. He searched for a table to sit at and spied Roger Anderson and Madhu Gupta-Anderson across the space. He turned toward them. "Are you planning to sit with Roger and Madhu?" asked Carmen.

"Yes."

"No arguing. I want a reasonably quiet supper."

"Well, you and Madhu can discuss the aesthetics of Aurorae; Roger and I have to debate politics." Carmen rolled her eyes at that one.

Roger saw them coming and smiled. Another chapter in a thirty year old debate was about to start. He looked at Érico's balding head of grayish hair; Érico contemplated Roger's full shock of white hair. They were 59 and 72 years old respectively. They both glanced at the large television screen on the wall that had just carried President Knight's first major speech.

"So, what sort of President will David Knight be?" asked Érico.

Roger started out cautiously. "We'll have to wait and see, but he's clearly a very genial, likeable fellow; relaxed, soft spoken, handsome, photogenic, friendly."

"If the image is real. It's hard to tell nowadays."

"Sure," replied Roger. "So far he's a breath of fresh air. Everyone feels sorry for Wells because of his pancreatic cancer, but he made a lot of mistakes. The last three years have not worked out well for the U.S. at all. Gasoline is still $45 per gallon and most cars use it. Unemployment is still ten percent. The economy is stagnant. International relations are stuck in 'bad.'"

"And Knight's going to help? The U.S. has bad international relations because Wells conceded too much to America-firsters like Knight's friends rather than being a true 'national integrationist.' He couldn't say 'internationalist'; the America-firsters have made it a dirty word. Knight's isolationist, militaristic, anti-world philosophy will only make relations worse. The U.S. has dropped to fiftieth place in terms of education—it imports half its PhDs if they're willing to immigrate. Wells spent billions to improve the educational system and Knight will get the credit for improved standards. Wells spent necessary billions on alternative energy that will lower consumption in the next four to eight years, so again Knight will get the credit. Americans are so short sighted."

Roger waved his hand. "Don't believe all the scare tactics. Knight isn't a fool and he's surrounded by smart people. He says a lot of things to cater to his base, which is the third of the American population that is scared of the rest of the world and sees the world as taking away American power and privilege. He needs to bring them along in his administration."

" 'Bring them along'? What does that mean? He was demanding that the U.S. pull out of all the international trade organizations and raise tariffs!"

"Pull the U.S. out: no, you can get your way better from inside. Raise tariffs: yes, some token efforts. It may not be wise, but he'll probably do that."

“He said he’d oppose the Grand Union with the full might of the United States.”

“He will. Look, most of us are internationalists, but most of the human race isn’t and most Americans aren’t. Most of the world’s peoples aren’t ready for the Grand Union; it’s premature by a century. He’s probably doing the world a favor by opposing it. A better international formula can be devised. The U.N.’s weak, but it’s something.”

“It’s amazing to hear Americans like Knight supporting the U.N.! Their parents thought it possessed black helicopters poised to invade the U.S. But now they prefer it to the Grand Union because it’s weaker.”

“Can you really blame them? The world’s a mess; most of it is in much worse shape than the U.S.”

“Not according to all sorts of livability indices; the U.S. is now down to twenty-fifth. Its life expectancy is thirtieth. Its per capita income is high, but only because some people make so much money they raise the average for the eighteen percent living in poverty.”

“Look, don’t lecture statistics at me. The U.S. has made its decisions about how to spend its taxes; other countries make their decisions. The U.S. has had a very impressive economic growth long term and it’s still the largest national economy on the planet, unions of nations excluded.”

“Do you think he’ll ban abortion again?”

“I hope he does! Abortion is part of the moral abomination and corruption of modern society. Societies are rotting from inside, including Marsian society. Until they adopt proper moral standards they’ll never achieve their ultimate purpose. Knight will

move America back toward its moral center and that's what most Americans want. Prosperity without morality and purpose is simply a gilded cage."

Érico looked at him. "It's too bad the moral center is so hard to define, then. Because every time the U.S. has had a 'moral' administration, it has increased the world's chaos."

"Oh, Érico, that's an old line of yours. The liberals have messed up the world pretty badly, too. They think they're being internationalist and end up encouraging terrorism and weakening the U.S. economy. Look, don't worry about Knight. It'll be fine, wait and see."

Érico chuckled. "We will see, Roger."

Will still tried to make a circuit of Aurorae Outpost at least once a week, walking through every major dome, checking for anything that needed repairs and surveying the construction going on. That sol he spent a lot of time in their last six domes: Cathay, Punjab, Zanzibar, Liberty, El Dorado, and Baltic. Two years earlier the first five, which were seventy meters wide and 340 meters long, had finally filled with about five hundred people each. The last one, one hundred meters by five hundred, potentially held sixteen hundred and construction was now flowing into its northern half. Niger, a large residential dome east of Baltic, was still mostly agricultural, but the ground had been broken for Niamey Square, its central development. There were no plans to push Aurorae farther east for at least four more years. Baltic and Niger would satisfy Aurorae's housing needs through 2070. After that, the formerly agricultural domes of Andalus Northwest, Cathay Alpha, Punjab Alpha, Zanzibar Alpha, Liberty Alpha, El Dorado Alpha, and

Baltic Alpha would be converted into suburbs and they would hold three thousand more people, sufficient until 2072. Low pressure farming domes would extend Aurorae northward another half kilometer. Then the eastward march of pressurized enclosures would resume. Already, including the space separating major domes that was being filled in with private underground construction, Aurorae was 1.6 kilometers—one mile—long.

After wandering through the expansion of Baltic onto the northern shore of Baltic Lake and circumambulating Niamey Square, Will entered Baltic South. He had wanted to climb to the top of Layercake Mesa and enjoy the view, but the cold made it impractical and the half meter of snow made walking extremely difficult. Even if the dust storm season had been mild, Baltic was in midwinter. A few skiers could be seen shooshing down the ski slope that ran down the center of the dome and two people were ice skating on the frozen pond at the base of the ridge. Two other skiers were trudging back up the switchbacks in order to make another run; the ski area had no lift.

So Will remained only long enough to enjoy the scene, then headed into Baltic to warm up. After crossing the square he walked northward and downhill to Baltic Lake. He followed the path hugging the southern shore and headed for Main Street North, the site of their limited public transportation system. A robotic bus arrived just as he reached the station. A few minutes later he got off at Andalus North and headed for his office. As he entered Andalus Square, his attaché beeped. It was Ethel.

"Hi."

"Did you hear? Amina just died."

Will stopped in his tracks. "No, I didn't. You just heard?"

"Marshall called me. He was crying."

“She was a special lady. She held out against the cancer longer than anyone thought she would, too.”

“I know. I feel terrible for David. I’ll have to call him.”

Will sighed. “I wish all this had ended differently. He had to resign as head of the Venus-Mercury Commission precipitously right when he could have helped resolve the tensions at Concord. Commissioner Choudhury is not very popular with the Europeans.”

“And now everyone on Mercury’s furious because he’s postponed further expansion until the low morale improves. At least Patrice has reacted positively by organizing a task force of distinguished experts on Mercury and Earth to study future expansion. David would have handled the matter more smoothly.”

“Yes, I agree.”

“Give him a call and express my condolences as well,” urged Ethel. “I’ll call him in a few sols when things quiet down.”

“Okay, love. Thanks. Bye.”

“Bye, dear.”

They closed the circuit. Will headed for his office, thinking about his dear friend David Alaoui and their youthful days on the moon together, then their time on Columbus One so many decades ago. As soon as he sat at his desk, he pulled up David’s number and recorded a message.

“Hello Daoud,” he began. “I just heard that Amina passed. I can’t tell you how sad I am. I’ll be thinking about you and her the whole day. You had a lifetime of joys with her, my friend. So much love and happiness.” Will’s voice cracked a bit; he paused to gain composure. “What a great partnership the two of you had. I still think of that post-

midnight couscous dinner at your house in Paris a few years back, and the meals she made us after we returned from the moon in 2032. So patient with all your absences! Not many wives let their husbands go to Mars for two years, let alone Venus for two more! Yet she was always hospitable. What a blessing she has been for you and the world. I don't know how your boys are coping; give them a hug for me, and their wives and children as well. I'm sorry I can't be at the funeral. At least we can be sure she's in a better place now, and I'm sure once she's oriented to it she'll be thinking of ways to assist us. I envy the peace she feels now, Daoud. We could all use more of that. Ethel and I are praying for you, my friend. She said she'll message you after the funeral when things calm down a bit. Bye."

16

Black Earth

Jan. 2068

Kristoff drove his tractor one last time around his land, then drove it to the garage, depressurized the cab, climbed out, and walked back to his fields.

They were finished; ready for planting. The thought thrilled him as he walked. That sol he had hauled the last three loads of topsoil in an airtight trailer down from his old enclosures up on the escarpment, brought the trailer into Ukraine through the airlock, attached it to the tractor, and spread it across his fields. For five months, throughout the dust storm season, he had hauled scores of other loads down as he had cleared the four enclosures, which New Tokyo had repurchased to expand its housing. He had purchased eight hundred tonnes of composting plant waste and animal manure and had spread it as well. He had even dug up two centimeters of topsoil from the Canyon Meadows enclosure when Ramesh was away on business and had added it to his new fields, since its ownership was unclear.

Once he reached the edge of his land he stopped to survey it, then headed to its very center to feel it. He panted in Ukraine's near-fatally thin air. In the last few months, as Ukraine had been developed by its various owners, everyone had found it more convenient for the enclosure to have more air pressure than originally planned; they maintained it at 0.11 atmosphere, 90% oxygen 5% nitrogen, and 5% carbon dioxide, plus additional pressure from water vapor depending on the temperature. It provided almost half as much oxygen as the Earth's atmosphere at sea level; enough for most people to

walk around for a short time, but not enough to exert oneself. Kristoff used a breathing helmet when he did any hard work, but he had gotten used to the low pressure otherwise. It allowed him to smell his farm, an essential skill for measuring things.

He stopped in the very center of his land, a rectangle of slightly rolling polder stretching across the entire three hundred meter width of Ukraine and running two hundred meters along its five hundred meter length. Good, black earth—he loved the irony of that word "earth"—surrounded him. True, it wasn't quite as rich as the chernozym soils of the original Ukraine, where tall grasses had perfected the loam for ten thousand years. The upper twelve centimeters of the polder was a mix of top soil from elsewhere, manure, composted plant matter, and the original sand, silt, and dust particles that had been present after machines had dug, sifted, and removed all rocks and gravel. It had a granular appearance, with black clods mixed with brown and reddish gray lumps. But it was rich; there was no doubt about it. It was alive, full of microorganisms and worms. The salinity had already been washed out by the process of warming the ground, establishing a shallow water table, and freezing the bottom of that table to the frigid ground below, sealing off air leaks.

Kristoff looked the length of Ukraine—half a kilometer, 1,600 feet long—and noted that he was the only person inside, so he took a deep breath and shouted at the top of his lungs "My land!" His words echoed off the dome and even seemed to bounce off the apex 150 meters—500 feet—above his head. It was an exhilaratingly immense space, and he owned the biggest piece. In fact, he owned a piece bigger than all of Aurorae Outpost when he arrived from Earth. He owned almost ten percent of the outpost's enclosed space; six hectares out of sixty-five. He could feed over six hundred people.

The rumble of motors seemed to respond to his shout and he jumped at first, surprised by it. Then he saw the silvered reflector begin to rise from the eastern edge of the enclosure, an immense nine hectares of thin but strong aluminized mylar. The hazy disk of the sun had dropped low enough so that the reflector would capture sunlight passing over the top of the ground and reflect it down. Kristoff watched the reflector slowly rise into place; it would take ten minutes for it to extend all the way up to the dome's apex. Already there was more light inside.

He glanced at the hazy solar disk in the western sky and realized that this was the first time since the dust storm season had started that the sky had cleared enough to make the midafternoon deployment worth while. At the height of the dust storm season the sun was almost impossible to see and the entire sky glowed uniformly; raising the reflector would decrease insolation rather than increase it. He looked south and saw the escarpment for the first time in five months. It had been a miraculously mild dust storm season. The computerized deployment seemed to be a sign that it was time to plant.

He turned and headed for the exit. He would go home, look up the long-term forecast, and if it was favorable he'd start planting.

Sarah Pannakar stepped out of the robotic ranger taxi and into her garage. She had engaged it to wait for her, so she didn't have much time. She opened the hatch leading into Canyon Meadows.

When she stepped into the central enclosure she was surprised to see Ramesh, trying to direct a robotic tractor to plant it. The central enclosure was an expanse of rough, barren, black ground, an embarrassment and a disincentive to purchasing lots in

Canyon Meadows. It had been empty since Kristoff had harvested the clover—and some of the topsoil, Ramesh suspected—four months earlier.

She turned and hurried to the entrance to their house, but not before he saw her. That would spoil her plan; neither expected the other to be home in the middle of the day. She entered the house, headed upstairs to their bedroom, pulled out her suitcase, and packed as fast as she could.

She only had enough for one suitcase; in the last few years Ramesh had had enough money for only a few expensive items, but almost nothing for ordinary clothes. She packed methodically, steeling herself for a likely confrontation. Just as she finished and was carrying her suitcase down the stairs, the front door opened. “Sarah, since you’re here, please make me some lunch,” Ramesh called.

That made her angrier, but it also gave her an idea. She continued down the stairs without answering and, based on where she heard him walking, entered the kitchen, then headed through it to the house’s main entrance. She opened the hatch and turned. He was standing about three meters away, looking at her. “Goodbye, Ramesh,” she said, and she closed the hatch behind her. Then she hurried across the airlock to the other hatch, knowing that until she exited the airlock Ramesh couldn’t enter.

She exited into the main enclosure. The robotic tractor was going back and forth, tilling the ground and seeding it. She stayed on the sidewalk and walked slowly. If he wanted to give her trouble, better that he did it in a public space, with cameras watching.

Before she reached the airlock to the main garage, Ramesh popped out of the house, sounding confused and angry. “Hey, where are you going? I asked you to make me some lunch.”

“Ramesh, I’m leaving you. I think the reasons are quite clear, after our argument this morning.”

“Leaving me? No you’re not!” He hurried over and reached down to grab her suitcase.

“Ramesh, don’t touch me or my suitcase!” she shouted, and pointed at the camera. “We’re being watched. If you lay your hand on me I’ll bring charges against you. All I have to do is shout and constables will be on their way.” She hoped the software was smart enough to detect the stress in the situation, and that she was loud enough for the microphones to pick up her voice. She was fairly close to the camera and microphone.

Ramesh stopped, disarmed. Force wouldn’t work, so he had to switch to persuasion. “Come on, Sarah. I know we had a bad fight, but it’s not something to break up the family over. Think about the children. This will tear them apart.”

“Ramesh, you should have thought about that weeks ago; months ago. I’ve made my position very clear a dozen times: we need counseling to keep this marriage from collapsing. And you need counseling over your behavior. If you hadn’t been nasty to Kristoff, this place would be green by now. You’ve missed most of the prime home purchasing season as a result. Most of our financial problems are the result of your bad behavior.”

“Hey, Canyon Meadows is my business, not yours, so don’t worry about it and—”

“Ramesh, I have my credit cards maxed out to pay for food and clothes for the kids because you haven’t shelled out a single redback to cover their expenses. Your business *is* my business. Your life is out of control and I’m not going let you take me and the kids down with you. If you want us back, you know what you have to do.”

"You're not taking the kids from me! If you leave, the kids are mine!"

"You don't even *know* your kids and you don't know how to take care of them. If you want to see them, we can get together in the Gallerie for supper every night, how's that? Then your precious public can see you as a good father and husband, if that's what you want." She pointed to the airlock. "My taxi is waiting in the garage, so I'm going in now. Good bye, Ramesh. Call me if you want to have supper in the Gallerie tonight." She turned and started walking.

"Sarah, please!" He glanced up at the camera. "Sarah, you're abandoning your family and your children! Stop! Stop!"

She felt a terrible, gut-wrenching pain as she opened the airlock hatch and stepped in, then closed it behind her. She loved him and hated him at the same time. She cursed the thought of abandoning him. When she opened the inside hatch and entered the garage she left the inner hatch open until she had everything in the taxi, so that Ramesh couldn't follow her. Then she slammed it shut and jumped into the taxi, commanding it into the exit airlock and hoping Ramesh couldn't get in quickly enough to make a scene.

Helmut always found the hub of the *Piazzi* disorienting. The elevator had taken him from the ship's outer rim, where four revolutions per minute produced gravity ten times stronger than Ceres's and perpendicular to the asteroid's pull, to the hub, where centrifugal force waned to nothing and one had to shift one's feet from the "floor" to the "wall." It was very strange when the square elevator door opened and one stepped onto a floor that was oriented ninety degrees from the elevator's floor. But such was life on Ceres.

He stepped out, grabbed a railing, and began to walk across the hub as fast as he dared—0.04 gravity was close to weightlessness and gave one little grip on the floor—to the ramp to the ground. The ramp was a forty-five degree angle, which seemed steep but was easy to handle in Ceres gravity if one held onto the railings. The tunnel it occupied descended to the asteroid's surface, then ran a hundred meters eastward to the *Olbers.* There were three doors; the first, on the right, led to the spacesuit donning area and garage; the second and third, on the left, led to Greenhouses 1 and 3. He pulled himself down the corridor as quickly as he could, holding onto a plastic ring that slid along a track built into the wall and kept him going in the right direction. As he approached Greenhouse 3 he pushed a button to open his ring so it would come off the track, dropped it into a pocket, and turned to enter the greenhouse.

He passed through a pair of hatches and entered steamy verdure. The first ten meters of the standard thirty-five by seventy-five meter enclosure was tropical, with citrus trees, nut trees, bamboo, and twenty other species of use to their life on Ceres. The enclosure soared to seventeen meters over his head, but a taut sheet of transparent plastic formed a ceiling five meters above; the empty, open space above it was for recreational use. A woman who had donned wings was flying in the space as he pulled himself through the verdure below.

The tropical section was followed by a temperate area that was mostly planted in soybeans and wheat. They were mature and almost ready to harvest; the greenhouse's first major crops. He pushed through them quickly—a series of ropes provided a good grip—and passed through two hatches into greenhouse four.

It was teaming with activity, with four workers inside and three outside, the latter using jet packs to maneuver against the “mirror” that enveloped both greenhouse 4 and the adjoining greenhouse 2. He immediately noticed that the air smelled different than in the other greenhouse; plant smells were almost absent.

Sophie Chen and Adam Haddad stood together looking at the workers overhead. Helmut floated over. “How’s it going?”

“The dome’s repaired,” replied Adam. “That wasn’t a problem. The leak left plenty of frost around the hole, so it was easy to find. Air loss was pretty small.”

“My nose says most of the air was replaced.”

“The enclosure lost maybe a third of its atmosphere,” explained Sophie. “The hole was only two millimeters across. Repairing the mirror is more complicated.”

“No, don’t worry,” replied Adam. “Just because a rib was hit doesn’t mean the mirror is unrepairable. All the pneumatic shape controls are triply redundant—”

“I didn’t say unrepairable,” responded Sophie. “I said more difficult than the enclosure itself.”

Helmut looked up through the dome to the mirror. At the moment, inflated ribs were shaping the mirror into a big, flat pancake, so that workers could walk on its flat top. By inflating any combination of over one hundred ribs they could change the shape of the mirror, thereby focusing concentrated sunlight on the greenhouses as the sun crossed the sky. Ceres received only an eighth the sunlight that the Earth received; plants needed more than that to grow adequately. “You had thought the micrometeorite had hit a rib,” said Helmut. “Were you right?”

“To be more exact, it hit an air valve,” replied Adam. “It’s a pretty amazing coincidence. But we’re replacing the valve and sealing up around it, and the rib should work fine when we’re done.”

“An eight or ten hour job,” added Sophie.

“I wonder whether we’ll have to deal with any more micrometeoroids,” said Helmut. He looked down at the wheat growing around them; the second crop, and it was only a month from harvest. He reached down and picked up a bit of the dirt. “Rich, black earth.”

“Well, crushed chondrite looks black pretty quickly; it already has some carbonaceous compounds in it,” replied Sophie. “It is pretty rich, though. The leak won’t have any impact on agriculture.”

“Excellent. The four greenhouses are more bountiful than we expected. We can almost feed everyone on two.”

“They have worked out well,” agreed Sophie. “Once all four are set up, we can lower the plant density in them and add a clover lawn, some benches, and maybe allow swimming in the fish pond.”

Helmut nodded. “That’d make this place much more pleasant. Adam, do you see any delay to the drilling project?”

“Minor only; maybe half a day. The drill should start up early next week. I’ll take the rest of the time from completing the garage. We’ll lose maybe two days work on it because I want a team do a thorough inspection of this greenhouse tomorrow.”

“I can transfer some staff time from exploration,” said Helmut. “That’ll help. It sounds like the PGM mining won’t be delayed.”

"No, once the drill is set up and the garage is finished, the construction team will become the mining team," confirmed Adam. "Set-up has taken a month longer than scheduled, but it's almost over."

"The impact of the incident is more psychological," said Sophie. "It reminds us that our facilities are vulnerable."

"Something we knew all along, but don't like to be reminded of; just like our own mortality," said Helmut. "Okay, I'm going back in to send a report to the Commission. I'm calling a heads of staff meeting for Frisol afternoon and an outpost meeting for Satursol to calm nerves and review priorities. We've been here over six months; it's a good time. I get the feeling that we have some differing views about the priority of mining, drilling, and surface exploration, and we can get only so much off-world support of the activities; most of the work falls on the same fifty adults. So we need to make sure we're on the same page."

"This is kind of fun," said Liz to Mike. "It feels like the Garden of Eden." The two of them were the only ones in Gamma Dome, which had turned bountifully green since it had been inflated fifteen months earlier. She had stripped down to shorts and a bra; he was wearing shorts and had taken off his shirt.

"I don't know why they haven't developed a robot able to pick red raspberries," he groused.

"They're tender, soft things; not like strawberries."

"Then why grow them at all? You don't have them on Mars, do you?"

“I don’t think so. I’d never seen red raspberries until I visited Earth, I suppose because robots can’t pick them. Seems to me I heard they’re raised here because some European lobby—an Association of European Red Raspberry Growers, I suppose—shelled out a few tens of millions of euros to get the plants here, then advertised that their raspberries were being grown on Mercury.”

“The usual crap,” replied Mike. “Advertisers distort our priorities and waste our time. I’m a geophysicist, not a migrant farm worker.”

“Oh, Mike, never mind. Just enjoy the experience. We’re out in nature—such that it is—we’re together, and I’m getting a tan. It’s a tan that’s even, since the sunlight is hitting me from all sides.”

“A small reward!” He laughed. “I suppose you’re right. We have to do some food-related work every month and this is better than cleaning fish.” He popped a few red raspberries in his mouth. “And they’re not bad.”

“They grew real well, and fast, in this rich, black, Mercurian earth we have.”

“‘Mercurian earth’: Sounds like a contradiction. But you’re right, we’ve figured out the lighting, nutrients, and water in here just right. I can’t believe we have trees two meters high, after fifteen months! They really like the CO_2 and the soft, even, almost continuous light. I’ll miss this place.”

“But you do want to go back to Mars, right?” Liz was surprised by his comment.

“Yes, let’s go home. I want to go back. Mars is the place to be, and I can pursue my research as well or better there than on Earth.”

“Especially with John and Christina going there.”

“Yes, isn’t that a surprise! Pierre couldn’t help them with fertility treatments and recommended surrogacy.”

“But they can get surrogates on Earth, too. I think they don’t want to be on the same flight as Olaf and Oxana. The Norlanders would have gone to Mars, but the flight’s too long for the kids, so they’re going to Earth on the galleon.”

“You think they were ordered off Mercury?”

“Christina hinted to me that that was the case. If it’s true, they’ll say so; it’ll be their last act of criticism of the Commission.”

“Maybe they’re holding their tongue because they’re appealing the decision. I suppose they’ll be trouble makers on Mars.”

“I hope not. They’ll be small fish in a big pond there, rather than big fish in a small pond, like they are here. I suspect they’ll focus on family and research.”

“Before it’s too late; they’re both in their late forties.” Mike smiled. “You still want to start a family after we get back?”

“Yes, it’ll be the best time because my dancing career will be in transition anyway. I’ll be 26, going on 27; a good age for motherhood. Mom says not to wait, It only gets harder.”

“She was forty when you were born. My parents were almost that old also.” He paused. “I need to write my dissertation right away.”

“Write it on the flight home, then refine the data with Martech equipment, like John suggests!”

Mike laughed. “It’s backward, but it won’t be the first time a dissertation was written that way!” He stopped picking for a moment and stood up straight to look around

Gamma, 75 meters in diameter, stuffed with plants. “You know, I wouldn’t mind coming back here some time. I really like the geology of this rock. Not to put down Mars, but this place has an active magnetic dynamo and its core will be the focus of active geophysical research for decades. I’ll spend a lot of time studying this place, even from Mars.”

“I wouldn’t mind coming back, either, if the disunity and petty bickering ends. And the personnel changes will help a lot.”

“I agree. There are a lot of changes coming. The split of the Venus-Mercury Commission into separate agencies for each planet should help a lot.”

“That’s what the experts say, but growth has a lot to do with money.”

“But this place will be getting more funding, at least if the recommendations of the Future of Mercury Task Force are followed.”

“Two hundred personnel on Mercury in twenty years.”

“No; two hundred scientists. With support personnel, mining personnel, and families, that translates into a Mercury population of maybe a thousand people.”

“But will the recommendation become policy?”

“Patrice is pushing it as hard as he can. Imagine what this place would be like with a thousand people! The Commission will probably purchase two galleons, which means people can be moved here with their families fairly inexpensively.”

“You’re more optimistic than I. At least the proposal has prompted a long-term development plan, with domes stretched out along the rim of Elysium Crater.”

“Imagine some day, next century, a forty-kilometer circuit of the crater rim will be complete and one could jog all the way around, dome to tunnel to dome.”

Liz laughed. “That’ll take a lot more than a thousand people! But who knows. At least they’ll be running galleons back and forth between here and Mars in a few years, and they’re massive enough so that kids can ride in them safely. So sure, in a decade or so we could come back, a kid or two in tow.”

“Venus is another possibility; Magellan Station will probably get galleons as well, so cosmic radiation won’t be a problem, and parts of it have Martian gravity.”

“Okay, that’s a third planet. At least you’re keeping my dance career in mind.”

“Definitely, I love to watch you dance. And Venus’s inner and outer cores are quite interesting; a lot more research is needed.”

Strong applause roared from the crowd in the chamber of the House of Representatives as President Knight completed his State of the Union address. Ethel shifted around on the couch and glanced at the clock; it was 24:23. “Time for bed,” she observed. “I’m not sure I’ll sleep well after that.”

“It won’t be easy,” agreed Will. “I suppose I’ll have to say something nice about the speech.”

“That won’t be easy, either. Do you think he’ll really pull the United States out of international trade organizations and cancel ratification of a dozen treaties?”

“Everyone was saying that those promises were empty gestures to his base, but I’m not so sure. He has made it very clear that if the Senate refuses to ratify his choices for the Cabinet, he’ll go with interim appointments or make his people acting Secretaries instead. In other words, he will ignore the Senate. There will be a huge fight over the

budget, and he's willing to let the government get shut down if Congress doesn't give him what he wants. I think he'll intimidate enough Congressmen to get his way."

"He's hugely popular." Ethel sighed. She rose from the couch. "It's a country we can barely recognize, Will."

"I'm afraid you're right. This is the natural consequence of a democracy based on image, likeability, and marketing. The opposition is divided and weakened; they don't have a coherent message to market, so his media operation will dominate. The consequences could be serious; Knight's naïve about the world."

"The irony is that Knight is no Hitler, but he's manipulating the public in the same sorts of ways and trying to gain the same sort of power." Ethel's voice rose with rare passion when she said that. "It's very sad and rather frightening."

"I agree. Go to bed. I'll draft something short to run past Jacaranda and Huma. Our congratulations can't wait until the morning."

Will rose from the couch, feeling depressed. He turned off the light in the living room and headed for his little home office. There he was pleased and surprised to see Jacaranda had already emailed him a short statement of congratulations to the new President. Apparently it had been written before the speech; it stressed Mars's desire to cooperate and collaborate with Earth's most powerful nation. He approved the statement and sent it on to Huma.

He brushed his teeth and prepared to go to bed when his attaché beeped with an urgent message. He looked; it was from Pete Theodoulos, who had been operating from Bermuda for the last four months.

Pete looked cold. Apparently he was sitting on a park bench outside the U.S. Capitol. “Hi Will. I’m not sure you’ll get this message until the morning. I just left the speech and was walking to our Embassy when I got an email message from the Acting Secretary of State’s office, which I’ll attach to this videomail. It says that the credentials of all ambassadors must be presented to the new Secretary of State’s Office for acceptance! The nerve of them; it suggests they’ll refuse to recognize our Ambassador! At any rate, we’ll resubmit Ruhullah’s credentials right away. He and I will be attending as many receptions and cocktail parties in the next week as we can manage. The big reception we’re hosting at the Hilton in two weeks for the entire Washington diplomatic corps should strengthen our contacts here. We’ll let you know what we learn. Bye.”

17

Phobos

Early Feb.,2068

Will was very impressed by Phobos Outpost's new Atrium. With a population of almost 400 and a newly acquired responsibility to serve as the arrival point for passenger flights from Earth, the outpost had needed a new public space. But what a space! The Atrium filled the heart of the outpost's new central facility, the "Apex" module, a buried flying saucer sixty meters in diameter, with a thickness of fourteen meters at the rim, increasing to twenty meters at the center. The heart of Apex also served as its hub, because inside its hard skin of plastic fabric, kevlar ropes, and sheet steel, Apex's contents were spinning at four revolutions per minute, creating a gravitational force of half a terrestrial gee at its outer rim. Apex's 48,000 cubic meters of space had more than doubled the size of Phobos Outpost, providing it with housing and work space for 350 people.

The original plan had been to locate a complex of shops and the cafeteria along Apex's spinning rim, but the sharply up-curved floor, coupled with a three-meter ceiling, would have produced very short sight lines; a speaker or a performer would have been at the bottom of a bowl, whom no one more than ten meters away would have been able to see. Moving them to an open hub was a stroke of genius. The word atrium, conveying the idea of a central space, described the area very well, for it was not only the heart of Apex, but the new heart of Phobos Outpost.

Admittedly, it produced the spectacle of being able to look straight up and see the heads of other people eighteen meters "above"; it was strange being able to see chairs and

tables, buffet lines and display areas, potted plants and mechanical areas, all the way around. Crossing the very center of Apex's space was a transparent tunnel and one could see people moving around in it as they entered or exited the module. Three elevator shafts enclosed in plexiglass descended from the hub along one wall; the elevators had large windows so that the occupants could look out across the Atrium. Both walls had television screens along its circular bottom that either carried programming or three dimensional images. One very large screen showed Phobos Outpost from a stereo pair of cameras mounted on an antenna nearby; at a glance one could see that the sun was high in the east. Another screen usually carried the BBC news. Above the screens, the wall surfaces were greened by potted plants, the vegetation providing valuable acoustic dampening in what would otherwise be an echo-filled space.

Filling the thousand square meters of floor space were 450 new arrivals from Earth. Their caravels had aerobraked into Martian orbit two and a half sols ago and had been met by tugs that had brought them to Phobos just six hours earlier. After landing, inflatable tunnels had been docked to them, giving the arrivals complete freedom of movement in the outpost until shuttles could take them to the surface. They had been thrilled to escape the cabin fever of their confining vehicles and float through Phobos's endless chains of agricultural enclosures; many were signed up for classes certifying them in asteroidal EVAs. They crowded the cafeteria so tightly that the store had closed and moved its displays together so that there was more room for tables.

When Will entered, the lines at the buffet tables were getting shorter. He headed for the nearest one, much to the surprise of the new migrants waiting there.

“Commander . . . I mean Chief Minister,” said the startled young man right in front of him. He looked *very* young, with a baby face and soft, pinkish skin.

“Chief Minister Will; we use titles and first names together all the time up here.” He extended his hand. “What’s your name?”

“Ah, Carter. Carter Levine.” They shook hands.

“So, you’re . . . American? What’s your specialty?”

“Yes, I was born in Colorado and raised in Oregon and Idaho. I’m here to do ataxite mining. I have a four year contract, but I hope to switch to exploration.”

It was a familiar story. “Great. What was your major?”

“Geology; Colorado School of Mines, class of 2066.”

“You got here pretty quick; you must have started training after graduation.”

“Exactly, including a year at Parenago.”

“Good; you come with a lot of experience. I bet the gee in this Atrium is comfortable to you.”

“Yes, it feels like the moon; maybe just a bit less.”

“Are you here to do construction as well?”

“Yes; sixty-five hours a week of work for the first year. They say it’s the best way to make it financially. I did construction at Parenago for six of the twelve months there.”

“You’re exactly the kind of citizen we want; smart, experienced, hard working, and young. Yes, the salary’s much better when you work long hours, and it’s better to do the long hours in construction than in ataxite recovery.”

“The latter’s a lot more tedious,” agreed Carter. “What brings you here?”

“Welcoming all of you, and I have business here periodically anyway.”

“When you first set foot on Phobos in 2036, did you think you’d ever see a place like this?”

Will laughed. “I couldn’t have imagined it!”

“I understand they’ve set up a net around the original landing site.”

“Yes, to keep anyone else from adding their footprints. You’ll see it if you’re here long enough. It’s just two kilometers away.”

They stopped talking to fill their plates from the buffet’s bountiful choices. When they came out of the other end of the line, Carter headed toward a table and Will trailed along. “Any space at your table?”

“You don’t have a head table?”

“No, and I want to sit with new arrivals anyway.”

“Sure, come along, then.” Carter sounded like he didn’t know what to think of the addition. He was walking toward a rectangular table able to hold eight that already had five, three men and two women. He knew the others. He nodded toward Will as he approached. “We have a guest.”

The others were surprised. One man rose to extend his hand; another one started to stand but knocked over his cup of coffee, which spilled in slow-motion. “Oh, I’m sorry,” said Will, putting down his plate to help catch the spilled cup.

Everyone was stumbling for a moment to get napkins. Carter turned to his friend. “Pedro, you should have spent time on the moon!”

“Sorry, this gravity is weird to me.”

“It’s weird to me, too; I’m in one sixth gee once every few years,” said Will. He sat. The table was now settling down. “It’s good to meet all of you. I’m Chief Minister Will; who are you?” He looked at the man on his right.

“Pedro Flores-Lopez.”

“From?”

“Bogota, Colombia and Houston, Texas, I’m a dual US and Colombian citizen.”

“Specialty?”

“Automated Equipment Specialist. I’ll be running plastic extrusion equipment in the Plastics Fabrication Facility at Aurorae once I finish my stint in construction.”

“Good.” Will shook his hand and looked at the woman next to Pedro.

“I’m Cassandra Ram from Mumbai, India. I’ve got a Bachelors in Business Administration and I’m here to run three stores in Cathay Dome.”

“Ah yes, ‘run’; that means sit in one place, look at a lot of tv screens, and try to answer a zillion questions without leaving your central location.”

“I hope it isn’t that bad!” She laughed nervously.

“No, only once a month, and when Aurorae’s full of new people who don’t know their way around the stores and their websites. I’m intrigued by the ‘Cassandra’; it’s not a typical Indian name.”

“I’m really Kalyani.”

“Up here you can use either; people can handle Kalyani.” He looked at the next man.

“Khaldoun Sohraouardie from Niger. I’m a heavy equipment specialist, here to build roads.”

“I haven’t met many folks from Niger up here! I suppose you’ll find yourself half way between Dawes and Cassini, where we’re upgrading the trail to ‘highway’ status.”

“Yes sir, and then on to Jumla, and there are two other Nigerois up here, sir.”

“Very good. And you are. . .?”

“Qiu-jing Yee,” the young woman replied. “Bachelors in engineering, Shanghai Institute of Technology. I’m part of the new galleon construction team here on Phobos.”

“Excellent; then you’re already home. Apex is basically a galleon, so you can see what you’re building right here.”

“I gather the new models will have an atrium like this, too.”

“I think that’s correct,” agreed Will. He turned to the last man, with long, blond hair who looked a bit older than the others.

“Anker Christofferson.” He shook Will’s hand. “I’m from Helsingor, Denmark and I’ve got a Masters in Horticulture from the University of Seville.”

“Ah, so you’re from our Agricultural Institute.”

“Yes, the one that refused to be spun off; until the Mars Commission ended its support anyway. It’s doing pretty well as an independent agricultural institute within the university, and it still does a lot of Martian agricultural research.”

“They’re so good we still give them a lot of contracts. It’s a great facility and in a beautiful location. It’s great to meet all of you. I take it you met on the flight out?”

“I met Khaldoun at Parenago,” replied Carter. “Pedro was my roommate on the flight out and Anker was Khaldoun’s.”

“And we were all in the ‘Tokyo’ time zone on board,” added Cassandra. “So we saw each other at meals every sol.”

“How was the flight?”

They all laughed. “Crowded,” replied Khaldoun. “One hundred fifty people stuffed into something thirty meters in diameter and fifteen meters thick. But we were busy with classes and competitions.”

“We docked to the *Vega* for seven weeks, then to the *Canopus* for seven weeks, then for seven weeks we floated on our own,” noted Qiu-Jing. “Whenever we docked to another ship, it was an occasion to celebrate.”

“That’s what they do when three ships transit together,” said Will. “The changes in configuration break up the boredom and give you new zero-gee volley ball teams to play. And people are intentionally mixed ethnically as much as possible to break up clicks and establish a sense of internationalness. It’s difficult on some people at first.”

“That’s how Mars is,” said Carter. “I had thought we’d see the ‘Spirit of Mars’ when we arrived, though. I was disappointed when we didn’t go to Embarcadero.”

“It’s right there.” replied Will. He turned to the wall screen, which was about the size of a picture window and a mere meter and a half from the table. The three-dimensional image on the screen made it look like a real window. Will pointed to a golden figure with its arms extended upward, a flame extending downward from its two feet, visible about a hundred meters away. “Since passenger flights now come here instead of Embarcadero, the Spirit of Mars has been moved to Phobos. The station-keeping unit was getting old; one sol last year the statue started to rotate, which made no difference to arriving ships since they might see it from any angle anyway, but it was a warning sign that the unit could fail entirely.”

“I was surprised Embarcadero was closed,” said Anker. “It’s too small for the volume of traffic.”

“Exactly, and its emergency capacity is limited. Phobos Outpost will keep growing, so if we ever seen arrivals in the tens of thousands per columbiad, Phobos will probably be in the thousands by then and will have plenty of spare consumables and volume to accommodate them, not to mention its low-radiation environment. A category 5 global dust storm could strand people up here for several months. Phobos also has the ability to produce plenty of cheap fuel to haul vehicles here.”

“What about cargo; is Embarcadero handling it?”

Will shook his head. “That’s now based here and Deimos, because the task has grown so large. Embarcadero had reached the point where we had to maintain a staff of fifteen or twenty almost constantly. It was a hardship post; they were exposed to higher radiation levels and a lot of zero-gee. And they couldn’t do a lot in an emergency. In a few months we’ll dismantle Embarcadero and haul the modules here. We might set some of them up as a museum.”

“Did you ever think you’d live to see that?” asked Cassandra.

“No; I thought Embarcadero was a more or less permanent feature of Mars. That’s the second time someone has asked me a question like that, so I want to turn the question around. All of you are about 24; that’s about ten years younger than I was when I landed here. I’ve been on Mars thirty-two years now; in two more years it’ll be half my life. So what do all of you think this place will be like thirty-two years from now, in 2100? What will you be doing?” He looked at Cassandra first.

“In thirty-two years?” She thought a moment. “Interesting question. I suppose I’ll be married and my kids will be grown up. I hope I’ll be running a retail business of my own. And Mars will have tens of thousands of people, rather than a few thousand. It’ll have big towns by then; practically cities.”

Will nodded. “Actually, the projection would be four hundred thousand people, so we’d have some large cities by then, but who knows.”

“How do you make projections like that?” asked Carter.

“That’s the middle-growth projection. The low-growth projection assumes two thousand migrants every columbiad, which is the scheduled rate in 2070, and two thousand children. That’s roughly two thousand new residents per year; in thirty two years that’s sixty-four thousand new people on top of the seven thousand we have now, for a total of seventy-one thousand. The middle projection assumes one additional galleon every columbiad, making two round trips and carrying a thousand people per trip. So that assumes two thousand migrants in 2070, four thousand in 2072, six thousand in 2074, etc. The projection of the number of new children is a bit more complicated, but basically increases at the same rate but four years later. That projection gives us about four hundred thousand people in 2100. The high growth projection assumes that our population doubles every four years; thirty-two years is eight doublings, which is two hundred fifty-six fold; multiply by seven thousand and you get 1.8 million.” He let them digest the numbers while he ate a bit. “So, Khaldoun, what does that do to the plan for your life, thirty-two years from now?”

He smiled. “I want to do one of two things; either get a Masters and maybe a doctorate in civil engineering, or go into the construction business myself. Or maybe I’ll do both. Either way, the growth you’re talking about means I’ll have a lot of business.”

“Definitely. Qiu-jing?”

“Spacecraft design; that’s where I want to end up, and it sounds like there will be plenty of demand.”

“Rapid growth makes some things easier. Anker?”

“I’ll probably go into agribusiness, but I like research so it’s a possibility. The Marsoform Project is exciting.”

“It is, and we need farmers. Pedro?”

Pedro considered a minute. “I don’t think I’ll want to be an equipment specialist forever. I suppose business.”

“A lot of business people! Good, we can’t retain a fast growth without a strong private sector. Carter?”

“I don’t know. I’d like to do geological exploration; maybe the asteroid belt or Galileans. Even Mercury or Venus would be interesting. Politics would be a challenge. Administration, too; maybe I’ll get a law degree via distance education.”

“Good. I’ll leave all of you with this challenge, then: draw up a long-term plan for your life. Focus it first on what you will do for Mars, then consider what those goals can do for you. Because Mars’s success is what guarantees our success, not the other way around.”

The next morning, Will was awakened early by an “urgent” beep from his attaché. He sprang from bed, tumbling in the 0.2 gees of his bedroom; he had had no time to adjust his reflexes to it. He picked himself up from the floor and touched the screen. It was an emergency message from Pete Theodoulos.

“Hi Will. Sorry to wake you, but I just got the strangest message from the American State Department. The message reached me at 1 a.m. Washington time. Maybe they sent it then because they knew I was in Malaysia and could receive it immediately. I’ll attach it. It says that they were no longer recognizing the credentials of Ambassador Islami and that they would henceforth deal with me directly as Foreign Minister. Yet the message was signed by a new Undersecretary I haven’t even met, not by the Chief of Protocol or by the Secretary of State.

“This is a major diplomatic incident. With your permission, I plan to send the message to the Secretary of State, noting that I do not receive messages from Undersecretaries directly and that messages from Undersecretaries should henceforth be directed to Ambassador Islami instead! That’ll make the point, but I’ll start lining up diplomatic support for Ruhullah. It’s outrageous treatment; no one withdraws an *agrément*. I’m sure we can count on the Dean of the Diplomatic Corps to write on our behalf; she’s quite decent and reliable.

“Sorry to ruin your morning. I think I’m on the verge of recommending two more Ambassadors to you, and we have six new Chargés d’Affaires we can appoint. Gradually, our diplomatic corps is taking shape; it’s a good thing I’m operating from Earth rather than from Mars. Bye.”

Will turned to the *note verbale* that Pete had attached; it even had a typographic error in it. “They’re appointing a bunch of country hicks to the State Department,” Will growled to himself, then he hit “reply.” “Pete, don’t worry about waking me up. The timing may not be a mistake; I’m scheduled to meet with Ambassador Stark in three hours. This new administration has a pattern of playing hardball with everyone, as if that will make up for America’s shrinking role in world affairs. Yes, let’s protest this and maximize their embarrassment. It is outrageous. As soon as we determine we’ve been officially notified—it sounds like we haven’t been yet—I’ll issue a statement. Bye.”

That started the sol in a fowl mood, and his aching knee from the tumble made it worse. He showered, dressed, and headed to the Atrium for breakfast. Then he went for a walk—or perhaps one should say a “float”—along Agri North 1 to its end 700 meters away, then back along Agri North 2, thirty meters to the east. Sometimes he floated along in the transportation corridor built into the curved central top of the enclosures, looking down through the transparent plastic floor at the verdure below; other times he entered the lower level and floated among the plants, pulling himself between the two parallel lines of ropes.

After calming down a bit he entered Agri South 1, a series of thirty-five by seventy-fives that was 1125 meters long and connected Phobos Outpost to the American nuclear engine assembly facility. Brian Stark had wanted to show him around and re-open discussion of some parts of the long-term lease. Floating through over a kilometer of greenery—Phobos could now feed 1,300 people—had a calming effect, but it didn’t last long. Brian Stark greeted Will at the facility’s security station.

“I’m glad you made it, Chief Minister Will.”

“Thank you, Ambassador Brian, I’m honored to get this tour.”

Stark pointed to two hatches. “The left one leads to the microgravity facility, the right one to the gravitied facility. Let’s start on the left.”

Will nodded and floated along behind Brian as the latter opened the hatch. They passed through a short tunnel and opened the hatch at the far end, which led them into a galleon-sized space, a domed saucer sixty-three meters in diameter and twenty meters high in the middle. It was divided by metal walls into various labs and storage areas. “We can assemble one gaseous core engine here at a time. Up to five a year, depending on how experienced we get and availability of parts from Earth. The engines parts are made there, but they’re too massive to launch in one piece, so we put the pieces together.”

“Ten percent of the parts are made here.”

“Yes, ten percent,” agreed Brian. He led Will to the assembly area. The engine was encased in a jungle-gym of tubes that gave the robots and workers something to anchor themselves to, so they could get work in zero gravity. The far end of the space had an enormous airlock for moving parts in and completed engines out. For fifteen minutes, two experts showed Will the parts and explained the order of assembly.

Then they moved to the gravitied facility, which was a modified caravel. The tour was quick; it was mostly labs, small work areas, and a dozen sleeping quarters. It ended at an office Brian was using. “Sorry I don’t have tea, coffee, or cookies to offer you. I get here maybe three times a year,” he said, sitting and pointing Will to a seat. “It ain’t huge, but it’s a beginning.”

“It’s fine. This place doesn’t have to be big; it’s opening the outer solar system to humanity and is a key to Mars’s future.”

"You're right. And we plan to expand it; we're glad to have it on Phobos where we can participate in the life of a very vibrant outpost. Deimos will remain important to us as a testing facility; its isolation is crucial. But work that can be done near a large facility, will be; it provides safety and comfort. Burial gives us considerable security, too. If the United States government is to expand its presence here, it needs a real reservation."

"I thought we resolved the matter eighteen months ago."

"The new administration has asked me to reopen negotiations. They're looking at a major expansion of the American role in space, in low Earth orbit, on the moon, and in Martian orbit. The expansion will also involve realignment of America's cis-jovian plans and possibly the Saturn mission."

"Sounds exciting," replied Will ambiguously, for in fact Brian's comments sounded like a prologue for hard ball negotiations. "By the way, do you think these discussions are in any way related to the letter mistakenly sent to our Foreign Minister a few hours ago withdrawing the *agrément* of accreditation of Ambassador Islami?"

Brian was puzzled by that. "A letter sent by mistake?"

"Well, the Chief of Protocol or the Secretary of State has to send a letter like that, not some Undersecretary, so we sent it back. The Undersecretary can communicate with Ambassador Islami, of course."

"I don't think the new State Department personnel are aware of protocol."

"We may have only six thousand people here, but we know how to follow it."

“I see.” Brian looked at him. “What we have in mind will not restrict the outpost’s growth. In fact, it could be a huge boost to Phobos. We could spend a lot of money here. We’re planning a big reactor.”

“We’d love that. We’ve already settled the issue of a reactor; you can have a one-kilometer security zone around the facility. Beyond that, as the money expands, the land used expands.”

“And how can we be sure the land will be available?”

“I’m sure we can figure out something.”

“We have a plan.”

“A reservation under United States jurisdiction.” Will nodded. “Email it to us and we’ll consider it. If we have any questions, we’ll have our Ambassador put them in writing to your government.”

“I see. By then, Will, the United States may have withdrawn its subsidy of your research. We could also end our power contracts.”

“You could, and we could cancel the treaty giving the U.S. the New Hanford and Deimos reservations. Then we’d all be cold and in the dark. So perhaps we should all start with a little cooperation, rather than with hard ball?” Will paused. “Tell the President we want our Ambassador recognized, but that doesn’t mean we have to do all our work through him. Our Foreign Minister is stationed on Earth and he’ll focus on our relationship with the Earth’s more powerful nations.”

Brian sighed. “Okay, Will, I’ll let him know. But off the record, let me tell you this: I’ve never encountered an administration like this one. I’ve worked for four

administrations in twenty years. I'm a loyal American and will do my best to represent my country, but this one is proving to be a test for many."

"I'm sure. What do you think is going on?"

Stark paused to find the best way to express his thoughts. "I think it's a question of pride. The role of the U.S. in the world has been steadily eroding for about seventy years. Part of it is economic; the U.S. has grown economically, but many areas of the globe have grown faster. Part of it is social: the U.S. has lost its edge in education because its public school system has not improved as fast as the rest of the world's. Part of it is diplomatic: Europe in particular has figured out how to work together in spite of national differences and their skills are being learned by the Latins and East Asians. Part of it is cultural: as the world has grown more interdependent, a large segment of American society has responded by growing more isolationist. That part has found its voice in Knight and it's asserting the nation's preeminence."

"But Brian, the ways it is asserting its preeminence are counterproductive. Just read the *New York Times* and a dozen foreign newspapers."

"I know, but this administration doesn't take them seriously. It doesn't even take the opinions of the *Wall Street Journal* seriously. It takes seriously its image in the conservative talk shows and Hollywood gossip shows."

"That's a formula for disaster; they mouth the administration's own line."

"I know, Will. And there are some of us working on the situation."

Sridhar Pradhan kept an eye out, when he entered Bangalore Dome. He wasn't there to say hello to Sarah, but his route from the Saturn Commission headquarters to

Martech took him through her dome, so it was natural to wonder how she was doing. He was immediately surprised and pleased to see her sitting on a bench set against one of the dome's buildings. Rajiv was a few meters away, rolling around on roller skates.

His face brightened and he waved. She waved back. "Good sol, Sridhar!"

"Good sol to you," he replied. Rajiv rolled toward him. "Uncle Sridhar see my new skates!"

"Yes, they're great! When did you get them?"

"Daddy gave them to me yestersol!"

"How are you doing with them?"

"I'm falling a lot," replied Rajiv, disappointed.

"Keep trying. I'll rent skates some time and roll around with you. But I haven't roller skated in twenty-five years, so it might not be a good idea!"

"You might fall and break something!"

Sarah was a bit embarrassed by that comment. "Uncle probably remembers how to skate, it's something you don't forget."

"I'm not so sure," replied Sridhar. He looked at her. "How are you doing?"

She shrugged. "Alright, thank you."

He walked over to the bench and sat with her while Rajiv resumed his wild circles. "How's the flat?"

"It's enough for me and the kids."

"Is he giving you child support?"

"Some. His finances are strained right now."

"What's his obligation?"

“We haven’t gone to court yet; the divorce won’t be final for a few months. So he’s not under any obligation. But he hasn’t been meeting the standard minimum payments listed on the Mars.gov website. My lawyer has written him twice.”

“Keep writing him. Ramesh is a proud man. He won’t admit mistakes easily. If I have to, I may sue him myself; not because I want my money back, but because I want him to learn.”

“I’m not sure he would learn, Sridhar.”

“Me, too.” Sridhar sighed. “When can I visit? I don’t know when you’re home.”

“Tuesol afternoons it’s just Rajiv and me. The twins are in daycare until 5:30, but he doesn’t go to after-school that sol. Come by then. Rajiv would love it, too.”

“Okay.” Sridhar rose. He turned to Rajiv. “Next time I see you in the Gallerie, I’ll buy you an ice cream. You need energy to go skating.”

“I’ll be there tonight with my dad for supper!”

“Good, maybe I’ll see you there.” Sridhar waved and headed on his way.

Liz was in a good mood. The lunch had been full of laughs; Mike was always humorous, but that noontime he had been exceptionally funny and the table had been receptive to his humor. Concord’s cafeteria was buzzing with life that day; the Caloris crew had returned and everyone was busy catching up.

She stopped in the store to buy some shampoo for the flat; fifty euros, but she had grown used to the prices. She carried it home and was changing clothes—daycare responsibilities were over and the afternoon would be dedicated to dance—when her attaché beeped. It was a videomail from Marshall.

She pushed the “activate” icon and Marshall’s face appeared on the small screen. “Hey Liz, just wanted to touch base with you. I hope all is well. I was at the university this sol and ran into Sammie, then Corrie about fifteen minutes apart. Funny coincidence. Sam’s getting married! Her name’s Mindy, she’s 25, Australian, and she arrived in September. She’s an engineer who arrived on the first flight to do construction. They’ve been living together the last two months, in spite of his parents’ disapproval. He says they like her, though, because she’s also an evangelical, though neither Sammie nor Mindy are very devout.

“Then I ran into Corrie while I was walking back to Andalus, and she’s getting married too! His name is Alberto, he’s from Philippines, he’s an accountant for the Mars Exploration Agency, and he’s pretty Catholic. Corrie’s become fairly Catholic too, by the way. And they definitely aren’t living together. Érico and Carmen are rather displeased the two of them are religious.

“Interesting, ironic changes. Did I tell you Amy and I are moving in with mom and dad next week? We just got a good selling price for our condo; the new arrivals have driven up the market. Mom and dad are hiring a contractor to convert your bedroom and mine into a private apartment. When you and Mike arrive, you’ll have a comfortable place to stay until you can buy a place.

“That’s about it. We leave Aurorae on Feb. 24 and trans-Saturn injection’s set for Feb. 28. It’s hard to believe launch is a bit more that three weeks away. All the cargo is en route, we’ve got the landing site finalized pending our arrival, and the schedule for exploring Enceladus and other moons is tentatively set. Give me a call back, okay? Bye.”

Liz had to chuckle at the abrupt end. She thought a moment, then hit reply. “Good to hear from you, Marshall. Not much news here, except I am sure you heard Olaf and family are leaving in the fall, about the time we board a caravel for Mars. Christina and John are coming to Mars on the same caravel as us, and the cat’s now out of the bag: the Commission did ask them to leave and they’re furious. They say they’ll sue, but I bet once they get to Mars they’ll drop it.

“Morale’s getting better. Mike’s going out on a last expedition to the south polar region next month for three months, then we count down to our departure for Mars in late September. I wish we were getting home before you leave, but the orbits of the planets are unchangeable. Thanks for the news, keep in touch. Bye.”

18

Launches

mid to late Feb. 2068

Ramesh and Sridhar watched the scene from the chamber of the Mars Council on Sridhar's big, three-d television screen. Ramesh sighed as he saw Father Greg step forward to deliver the opening meditation. "I should be there."

"Well, you aren't, are you?"

"Have you any sympathy, damn it? My character has been assassinated!"

"Be grateful you live on Mars. If the election had involved actual campaigning, your separation and financial problems would have been proclaimed by opponents and *then* your character would have been assassinated, and there would have been nothing you could have done. If you feel *Mars This Sol* didn't cover legitimate public news properly, sue them."

"With what money?"

"Not mine, that's for sure! I didn't interrupt your cash flow."

"No sympathy at all." Ramesh shook his head.

"One reason the borough is divided into electoral districts with two or three representatives is to encourage voters to vote for at least one new face. You were the one they didn't reelect. Maybe they'll reelect you next annum. You can improve your chances by reconciling with your wife, cleaning up your financial mess, and getting some counseling."

“Counseling: that’s all you’ve been saying lately. I’m not going to the hospital over this.”

“The counselors are there to help in precisely these situations. They play the role that grandparents and other trusted family members imperfectly played for thousands of years. It’s rare they deal with medical problems; they’re usually helping us cope with life and bring wisdom to us. A little outside perspective can really help sometimes.”

“That’s what you’re for, Sridhar.”

“And I’m leaving for Saturn in two weeks.”

“It’s hard to believe it’s late February.” Ramesh shook his head.

“Don’t change the subject. Look, here’s a possibility. Gandimohan Ramanujan is leaving with us. What if you talked to him? He won’t be around in a few weeks, so you won’t have to look at him and worry that someone knows your secrets.”

“I’m not worried about that.”

“You know Gandhi. Friendly, smart, articulate; a good counselor.”

“I know him from the temple and the Indian association and yes, he’s a nice guy. But I don’t need any help.”

“Suit yourself.” Sridhar paused. “Since you don’t need anyone’s help, I don’t need to be investing my salary in Marsian property. Most of my friends have a chunk of their savings in platinum stocks and the rest invested in a basket of terrestrial companies. Canyon Meadows has not given any return on investment in three years. Once I leave here I won’t be able to keep an eye on things, either. Maybe I should pull out.”

Ramesh turned red. “That’s blackmail!”

“Hey, I’ve got a bad deal investing with a cousin who won’t seize personal opportunities to move forward.”

“Shit!” Ramesh rose and stormed around the living room, ignoring the scene on t.v. If Sridhar pulled out, he’d have to declare bankruptcy.

“I’m serious. I don’t care if I get only some of my money back.”

Ramesh didn’t reply. He looked out the window at Baltic Square, on which Sridhar had a very nice view. He also knew that Marsian judges sometimes ordered counseling, though it was often ineffective in a coercive setting.

“Look, if I go see Ramanujan, will you get off my back?”

“Not if the visit is just for a cup of tea and a chat about cricket.”

“No, I didn’t mean that. He’s leaving; that does make it easier.”

“I thought so. He’s really helpful; I try to meet with him every few months to go over everything I’ve been dealing with.”

“Yuk, I can’t imagine that.”

“It really does help. Things don’t have to be kept bottled up inside; better to purge them and move on. You feel better, you have a better perspective on things, and you acquire a direction to move in. He’s good at that.”

“Next week I have some time.”

“Next week? How about tomorrow? His schedule’s pretty flexible right now, but it’ll get worse and worse as we approach the launch. Don’t wait. I’ll have to make a referral because he isn’t taking patients.”

“Alright then, damn it, I’ll call tomorrow morning.”

“Okay, I’ll email him later this afternoon. Have some more curry chicken.”

“No, I’ve eaten enough right now.” Ramesh sat on the couch again. He glanced at the screen. Will Elliott was walking to the front of the legislative chamber amid heavy applause. “I hate him.”

“Why? Elliott never did you any harm.”

“Because he’s popular.”

“Well, he’s smart, he knows how to lead, he doesn’t alienate people, he’s genial, and he has his act together. You’re smart and you know how to lead; you’ve proven that. And you can work on the other things. It’s never too late. This place is loaded with trainers who can help with the other skills.”

“I know,” He sighed and turned to the t.v.

Will reached the podium and looked around the chamber, which fell silent to hear him “I congratulate all of you on your election to this Mars Council,” he began. “Once again we have, as a society, participated in a constitutional process to choose our leaders. The result has been a demonstration to a humanity torn by rivalries and riven by partisan attacks that it is possible to choose leaders in a peaceful, just, responsible, and professional manner. The results are even more remarkable when one considers the lively discussion about values that dominated our ‘Future of Mars’ Forums. It is also worth noting that our elections produced a healthy ten percent turnover in the membership of the Council that was peaceful, not bitter or driven by ideology, a turnover that trains a wider range of citizens in the ways of legislation. Our election last month was a continued demonstration of the strength of the Marsian way.

“Almost ten years ago, in 2059, when Mars had a mere thousand residents, we made a commitment to grow to eight thousand in fifteen years. Eight thousand represents

one two-millionth the population of Earth and thus constitutes a milestone. Currently Mars has 4,900 adults and 2,000 children. The arrival of 300 more adults via Mercury and Venus early next year and about 800 children by the end of 2069 will bring us to 8,000, five years early. In one decade our population will have increased eight fold! We have many accomplishments to congratulate ourselves for. We also must thank the nations of the earth for funding our expansion." Applause followed and Will paused for it. Sridhar turned to Ramesh.

"The nations were supposed to fund most of that increase, but they generally reneged on their commitments. The platinum group metals funded it instead."

"Uzboi," agreed Ramesh. "We can be proud of India's contribution. Our numbers up here now exceed China's and they may soon rival the U.S." Sridhar nodded and they turned back to the screen, for Elliott was resuming.

"The next time Earth and Mars approach each other, a galleon on its maiden passenger voyage will bring six hundred migrants here in addition to twelve hundred transported via caravel. It will test a gaseous core nuclear engine that will make rapid transport possible and allow the immigration of children as young as five. In 2071 two galleons will make two round trips each, transporting about three thousand migrants. In 2073 three galleons will make two round trips each. If we continue to add one additional galleon every columbiad to the passenger fleet and that our natural increase continues at its present rate, in ten years Mars will grow to fifty thousand people and by 2100—fifteen columbiads from now—Mars will have over a quarter million people. We are a nation on the move, a nation of immense promise, the nation of the future."

He drove home the last sentence and had to pause because of the spontaneous applause. “This bright future forces us to balance short-term practicality and long-term planning in ways seldom attempted before. There are few precedents for designing for growth of one hundred percent every four years, decade after decade. We have a master plan for the growth of Aurorae to twenty-five thousand; but how does one plan for a quarter million? We have replaced interplanetary transit vehicles with caravels, then with galleons; what will we replace galleons with? The only way Mars can handle immigration of tens of thousands per columbiad is through commercialization and privatization, by making transport cheaper and improving economic incentives. Economists estimate we can double the value of our exports of platinum and gold, but only if we can export four to six times as much tonnage. We can capture only so much of the space market, and the space market will grow only so fast.

“Concerns such as these fill our minds as we set Mars’s priorities for the next annum and revise overall plans for the rest of the decade. Over the next four years we will sell some caravels, dedicate others to near-Mars asteroid exploration vehicles, and convert others into housing on Phobos. We will shift immigration to galleons, adding one galleon every columbiad. The cost of immigration will decline to about 1.4 million redbacks per migrant, exclusive of any imports necessary to employ the person. When the first galleon arrives in early 2070 it will be greeted by our first Ares passenger vehicle, able to bring two hundred to the Martian surface at once.

“Construction over the next two years will focus on facilities to produce galleons and Ares shuttles; we will be pouring several billion redbacks into building an up-to-date, automated spacecraft construction facility at Aurorae. Phobos will see a significant

expansion as galleon production there increases to one per year and as the United States completes a gaseous core nuclear engine manufacturing facility. With further expansion of Phobos's agricultural output, the borough's population will climb to six hundred.

"Domestic priorities are twofold: First, we will make two billion redbacks in grants and loans available to Marsian businesses over the next annum to build up production of consumer goods, construction-related items, and space vehicle related items. For the first time, more immigrants have gone to work in the private sector and on consumer goods than any other single sector of our economy. This domestic priority also boosts exports because we are a cheaper source of consumer items for the moon, Venus, Mercury, and the outer solar system than the Earth; all of them are ordering more. In a decade export of consumer goods and light manufactures may equal import of the same from Earth; this will mark an important milestone in our economic independence.

"Our second domestic priority involves long-term planning. Emily Scoville and Moses Waigwa are developing long-term plans for the expansion of all our existing outposts. The plans involve locating transportation corridors and zoning the area around each outpost so that development will be rationalized. Aurorae's residential areas are expanding westward, its manufacturing northeastward, its agriculture northward, and its air and space transportation southward. Most of Aurorae's high-pressure agricultural areas will be converted to residential space, widening our residential zone to about one kilometer. Agriculture will relocate farther north to low-pressure domes that can never be converted to housing. The air and spaceports will move farther south so that a two kilometer wide belt of residential domes can be built south of the mesas. A geological study will determine the stability of the escarpment in order to finalize the width of the

no-build landslide zone along the escarpment base. A study of the landslide potential in Little Colorado Canyon will also be conducted. Transportation corridors will be zoned for the top of the escarpment. Similar studies will take place around Uzboi, Dawes, and Cassini."

"That may resolve the fears some have over living in the canyon," said Sridhar.

"I hope so," replied Ramesh. They turned back to the television.

"Earlier this annum an automated bus system was established in Aurorae's South Main Tunnel. It will be expanded and improved later this year. The system is being supplemented by robotic taxis and personal vehicles in the form of used buggies. Private manufacture of golf-cart sized personal vehicles, using a minimum of imported parts, is scheduled for next year.

"Our priorities for mining are unchanged; platinum group metal and gold production continues to rise, but slowly, since the sales price is declining for a variety of reasons. Lunar production at Parenago is not scheduled to increase further and Ceres will not produce a significant quantity of PGMs, so competition should not change the market, though prices will remain volatile because of the changing political and economic conditions on Earth. Export income currently is adequate for Mars's needs, and increasing that income will consume a significant sum that could be better directed elsewhere.

"Science priorities also are unchanged. Currently two hundred fifty persons are involved in the scientific exploration of Mars, a number increasing about ten percent per annum. An important new priority is the Marsoform Project, which seeks to create a life form able to survive on the range. Marsoform represents our first exploration of a

technology capable of producing a partial terraformation of this world, for it will sequester carbon and partially oxygenate the atmosphere. Before the project receives major funding, a debate about its implications is essential.

"Our final set of priorities look outward. Foreign relations have received a major boost with the arrival of our ambassador and Foreign Minister on Earth. While levels of financial support for the Marsian experiment have dropped as a result of independence, subsidies have leveled off and may even increase somewhat, and our embassies are playing a major role in increasing investment. In the past annum we made some difficult but important decisions to keep the redback as our currency and to not join the Grand Union. The Marsian economy is still too fragile and we are not sufficiently integrated into Earth's economy to give up the redback. Joining the Grand Union or any other group of nations will require extensive negotiations about the applicability of tens of thousands of laws, some of which make no sense in the Marsian context. But in the future when transportation of people and goods is cheaper and when Mars is larger, the balance of benefits and liabilities may shift. Meanwhile, over the next annum the Legislative Council will receive a dozen bills asking it to ratify various treaties and conventions that are a standard part of international law. This will gradually move us into accord with the other nations of Earth.

"Finally, Mars has a space program of its own; the structure was set up and its first mission to a Mars-passing asteroid was completed in the last annum. More importantly, however, Mars is intimately involved in, and is the departure point for, missions to the asteroid belt, Jupiter, and later this month, Saturn. With the expansion of New Beijing Outpost on Callisto to over one hundred people, transportation to the jovian

system now involves two vehicles every annum. Passenger and cargo flights to Mercury and Venus are regular as well. It is easier to get to most destinations from Mars than from Earth; our cheap hydrogen and experienced staff have made us the transportation hub of the solar system. Because of our experience in organizing internationally diverse teams, our personnel are the majority of the participants, and persons seeking a career in exploration now flock to Mars. I have directed our Foreign Minister to open negotiations with all parties interested in establishing a colony on a moon of Uranus, with a tentative launch date of 2083."

He paused for surprised applause. "It could launch sooner if faster flight systems are developed and the technology for dealing with extreme cold improves. The Saturnian system will provide crucial experience. A colony will probably be planted in the Neptunian system within a decade of the Uranian system. It is possible Pluto or some other object in the Kuiper belt will be visited by human beings by the end of this century.

"That, my fellow citizens, is our destiny. By the end of this century we will be a vibrant and strong people numbering hundreds of thousands, a nation beginning to turn its attention to the habitability of millions of square kilometers of wildly beautiful land, an economy integrating into the essentials of the human economy, and the hub of the exploration of the solar system. We will provide a more and more important example to the home world how to govern a diverse society in a peaceful, just, and mutually prosperous manner. And by the beginning of the next century our sights will turn to the stars. I am not speaking in metaphors, but of interstellar exploration by human crews. It will be the task of the twenty-second century to send people to one of the nearby stars.

We can be sure that Mars will be central to the effort. Our hard work, dedication, vision, and unified effort will make it possible. Thank you."

Elliott stepped down from the podium amid strong applause. Sridhar nodded. "Impressive talk."

"He's always been pretty good with the vision thing," begrudged Ramesh.

"There was an article in the *Space Review* last month that said Elliott has four talents; vision, the ability to communicate, likeability, and skill at knowing when to delegate."

"I suppose. He has a moralizing streak."

"Mars wouldn't have 7,000 people if it weren't for him."

"Do you know how much he's worth? Something like 150 million redbacks."

"Are you suggesting he stole it?"

"No," conceded Ramesh.

"He's been here over thirty years and his salary has been two million redbacks for a long time. Ethel earns almost as much as a corporate vice president, and they've invested heavily in gold and PGM stocks. Hey, maybe you should ask him for a loan."

"Very funny. I'm not sure he's completely clean. There are persistent rumors."

"What, on RecallElliott.com? They're a bunch of fringe types on Earth, some of whom write tabloid articles that say he's in touch with aliens in flying saucers. He has an approval rating with the voters of 75%. I don't know anyone credible who would call him anything other than honest and clean-living. You're just jealous, cuz."

"I am not!"

"Suit yourself." Sridhar turned back to the screen. The image was so clear he could make out the faces of almost everyone in the chamber. The cabinet had sat together to the right of the podium; the Supreme Court in their black robes and the Diplomatic Corps in their expensive hand-tailored Italian suits had been to the left. It was a very impressive scene and suddenly Sridhar was struck by a wave of what he could only call patriotism. In just a Martian year the planet had built institutions for which the citizenry felt respect. He was going to miss Mars; Saturn wouldn't have anything remotely like it in his lifetime. All the more reason to return to Dusty Red in a decade or so, to watch his cousin's kids grow up and contribute to the exploration of space from what had become its hub.

It was a few sols before Will and Ethel had a farewell dinner with Marshall and Amy. Even though the young couple had sold their condo and moved in with them, launch and departure preparations kept them busy from dawn to midnight. Finally Marshall was able to arrange a few hours of peace and quiet and the four of them went to the Dragon and Phoenix, Aurorae's popular and expensive new Chinese restaurant in Cathay Dome.

"Ten years," said Ethel shaking her head sadly. "Such a long time."

"Not ten, mom," scolded Marshall. "More like nine. Don't worry, we'll keep in close video contact, and we will be back."

"I hope so," replied Ethel, and tear appeared in one eye. Marshall leaned over and put his hand on her shoulder; she smiled stoically and pulled herself together. "It's a long way, and I both hope and fear you will fall in love with your destination. You can't do good work otherwise."

“We’ll be back,” echoed Amy. “Saturn can never have the charm of this place.”

“We’ll use the flight very efficiently,” said Marshall. “There’s a lot of exploration to do as we get closer and the time delay shrinks. And I’ll write my dissertation.”

“And we’ll start a family,” added Amy.

“It’s strange to think one would intentionally start a family in space,” said Ethel.

“The radiation environment on board is quite benign,” said Amy. “The two galleons will fly back to back with their hydrogen tanks on the outside, so we’re very well shielded. And life en route will be much quieter than after arrival!”

“I’m sure of that,” agreed Ethel.

“My one worry is the situation on Earth,” continued Amy.

“Don’t worry about that,” replied Will. “If the United States drops its funding of all joint space projects next year, as the President announced the other sol, Mars will keep the expedition supplied and will send out one passenger flight every annum. The end of American support for the project won’t affect you seriously.”

“But they’ll fight Mars for control over the mission,” said Marshall.

“Yes, and you think the Saturn crew will follow the U.S.? Almost all of them are Marsian; few are of purely American background.”

“The fight will slow expansion, though,” noted Marshall.

“Definitely, and it’ll strain us to support you. We’d probably fly a pair of caravels back and forth rather than a galleon and send support cargo for the existing size of outpost, not for an expanded presence up there. We have to support exploration of the solar system; it’s Mars’s destiny.”

“But once upon a time, the United States saw it as its destiny as well,” persisted Marshall. “What’s going on there, dad?”

“It’s complicated. Part of it is a sense of privilege and a willingness to fight for a status quo that has been lost. Couple that with naïveté over where other nations will draw the line and you have a dangerous situation. China’s been nurturing the nationalism of its masses as well, the Latins are no longer willing to be pushed around by the Yanquis, the Europeans have exhausted their patience with the U.S., and Earth’s culture is becoming increasingly irrational. . . I think the future is pretty bleak.”

“War?” asked Amy.

Will shrugged. “Who knows? I don’t think it’s impossible, in spite of all the democracies. The crew of your mission, the citizens here, the residents on Mercury, Ceres, and Callisto. . . they will all feel conflicting loyalties.”

“Now I feel even more concerned,” said Ethel. “Has the Phobos reservation issue been resolved?”

Will shook his head. “The U.S. is demanding a nuclear reservation on Phobos as well,” he explained to Marshall and Amy. “This is not public information, so don’t speak to anyone about it. We managed to stall them two months and throw them off balance by communicating through Ambassador Islami rather than to Ambassador Stark; they had reneged on the previous administration’s credentialing.”

“I heard about that,” said Amy.

“That’s public information; there was a big public outcry by various governments. The U.S. caved in because they had other issues they wanted to deal with and we

managed to use that as a distraction. But now we have to deal with their request for a quarter of Phobos."

"A quarter!" exclaimed Marshall.

Will nodded. "They claim it's needed for a security zone around the proposed nuclear reactor, which is nonsense. They won't get it, but the question is how much damage they'll do because they don't get their way, and how much will China squeeze us if we have to turn to them for rescue."

"Can't they see that they're disturbing the political and economic equilibrium?" asked Amy. "In the last four months since Knight took over, the U.S. stock market has fallen twenty percent and the economy has slipped into recession, mostly because of new economic policies that aim to break U.S. interdependence with the rest of the world."

"They call it 'temporary economic adjustments,'" replied Ethel.

"Why hasn't the business community stopped this!" exclaimed Amy.

"Because of the realignments," replied Will. "The *Wall Street Journal* has been ranting against Knight for two years, but his followers don't read it. The business community's now largely Democrat because most business are in favor of globalization. Most African Americans and labor union people are now Republican. The old moral issues have been gradually replaced by 'America-first' versus 'national integration.' The world is now the issue."

"Meanwhile, the rest of the world's economies have been pulled backwards by the breaking of bonds of interdependency," exclaimed Ethel. "People are desperate; some are starving. And it's hurting us, too. Recession causes demand for petroleum, gold, and

platinum to drop, so commodity prices are dropping, Mars's income is dropping, and the value of stock in Marsian companies is dropping."

"Fortunately we have savings and good credit," added Will. "Look, don't worry about Earth. It'll do its thing, Mars will manage fine, and you all will be self-sufficient and insulated by a billion and a half kilometers of space. You're going to a fascinating, dynamic world of bubbling cryovolcanoes, methane rivers, waterfalls, lakes, seas, thick deposits of tholins, 4.5 billion years of events to decipher, a romantic ringworld in the sky, and a complex system of moons to study, some of which are Kuiper Belt Objects. . . Your work is cut out for you. If Saturn had a thousand people—and I suspect by the turn of the century it will—there still wouldn't be enough scientists to study it all. You are among the first. What you're doing is historic."

"You're right," said Marshall. "That's the way to look at it."

"And worry about survival," added Ethel. "Your self sufficiency as a community is essential because of the isolation, but that also means a disaster could doom everyone."

"That's why we've trained together so much for so long," agreed Amy. "We are a community; nationality is not important."

"You are true pioneers," said Will.

Three sols later, Will and Ethel rose early in the morning and accompanied Marshall and Amy to Arrival Hall for a tearful departure. As soon as the Mobilhab drove away bearing two dozen crew members, Will and Ethel headed for Baltic South, the only dome in the outpost that had a view of the spaceport.

They reached the top of Layercake Mesa an hour later, half an hour before launch. From the bare top they could see the shuttle, a little silver teardrop six kilometers away. Exactly on time the teardrop spat out a hundred-meter orange flame and rose quickly from the ground, flying soundlessly eastward. In half a minute it shrank to a tiny, burning bright dot, which gradually faded from view.

After almost four minutes, the dot suddenly disappeared. “Main engine cutoff,” said Will. “They’re in a Phobos transfer orbit now.”

“It doesn’t take long,” said Ethel. A tear flowed down a cheek.

Will saw the tear and came close to his wife. They embraced, then looked up at the sky together. Phobos was high in the east, a thin crescent moving at almost visible speed eastward toward the horizon. “They’ll catch up to Phobos in about three hours,” said Will. “Rendezvous with the galleons in orbit, transfer the crew. . . then the galleons will head for a high Mars orbit, light up their gaseous core engines, and head for Saturn in three sols. And they’ll be on their way.”

“God, I hope they come back safely.”

“Don’t worry, they should be fine. And tomorrow two caravels leave Gateway for Mercury, and when they get there Mike and Liz will be among the passengers boarding! They’ll be home in nine months. We won’t be alone for long, dear.”

“I know.” She put an arm around his back and pulled him close. “When he was born twenty-seven years ago, who would have thought he’d be leaving here for Saturn.”

“We joked about it plenty, but I wasn’t serious! It makes you feel old, doesn’t it?”

“Well, we *are* old, Will.”

“We’ve still got plenty of life in us, though.” He looked northward over the complex of verdant domes stretching over a square kilometer of Mars. “Come on, let’s go home,” he said. She nodded and they started down the mountain.

EM July 13, 2065
Autumnal Equinox: May 29, 2065
Winter Solstice: Oct. 23, 2065
EM Oct. 2, 2067
Vernal Equinox, Mar 30, 2066
Summer Solstice: Oct. 15, 2066
Autumnal Equinox, April 16, 2067
Winter Solstice: Sept. 10, 2067
Vernal Equinox Feb. 15, 2068
Summer Solstice: Sept. 1, 2068
Autumnal Equinox Mar. 3, 2069
Winter Solstice: July 28, 2069
EM Nov. 30, 2069
Vernal Equinox Jan. 2, 2070
Summer Solstice: July 20, 2068

Earth 3/15/67 Mars 9/15/67
Earth 6/1/67 Mars 12/1/67
Earth 7/15/67 Mars 10/15/67
Earth 9/1/67 Mars 2/1/68
Earth 10/1/67 Mars 3/1/68

Saturn 1 leaves Mars, 28 Feb. 2068

Christina and John talk to Liz and Mike about Marsian governance and express their many frustrations about Mercury's. Ceres II mission is launched, July 1 and Sebastian says goodbye.
DATE: early July 2066

5. The State of Things 60
Will gives his State of the Commonwealth address and later answers questions from the Council; forty new people arrive on Mercury from Earth; Ramesh criticizes Will's speech in a print interview. US, China refuse to join Grand Union and denounce it; South Africa applies to join Grand Union in 2055; Iran. US/Mars mission to Callisto is launched, Aug. 8 (1 year flight)
DATE: July 20-Aug. 6, 2066

6. Shaping Our Destiny 78
Mercury holds its first staff meeting after expansion to 101 people. Plans for the next four years are discussed; Olaf is angered by and opposes plans to discuss the Ceres Charter and propose greater home rule. The Marsian cabinet meets with Brian Stark and is briefed about purchasing gaseous core nuclear engines.
DATE: early Sept. 2066

7. Charters 94
Will meets Lisa Kok and they discuss low-pressure agriculture. Ceres Charter revised. Fight on Mercury over a Charter develops.
DATE: late Sept. 2066

8. Votes 112
Will debates Ramesh about constitutional amendment and wins; elections on Mercury sweep in the pro-Charter, anti-Norlander group; Will talks to Yuki Tajima and Pete Theodoulos about joining the Grand Union and abandoning the redback and rejects both; they talk about Syria, Iraq, rest of South Asia, New Zealand, and S E Asia/Pacific want to join the Grand Union; on Mercury, Mike leaves Concord for six month trip to south pole.
DATE: Late Oct. 2066

9. Changes 127
Two caravels arrive from Earth via Mercury with 270 more people; it carries three pistols for the Marsian constabulary; opposition to firearms mounts; an abortion is performed.
DATE: late Dec. 2066/Jan. 2067

10. Journeys 144
Will and Ethel explore Baltic South; Will meets Alexandra, who briefs him about the Ares shuttle project; Will meets Ruhullah about serving as ambassador and about the reconstruction of Bangalore and the first four domes; the Venus-Mercury Commission reorganizes and fires Olaf; Will meets with Kent, Yoshi, Indira, and Greg and negotiates a compromise about firearms.
DATE: Late Feb.2067

DATE: early Feb. 2068

18. Launches 268-85
Sridhar talks to Ramesh, who is not reelected about counseling; Will delivers the annumal State of Mars speech; Earth moving into another depression as new US President tries to pull the US out of international agreements; Marshall and Amy leave for Saturn; Mercury 1 leaves Earth for Mercury and Mars, will pick up Liz and Mike;
DATE: mid to late Feb 2068

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