THE MARS FRONTIER

Vol. 17

Fires of Conflict

Contents

1.

Flames

Late Sept. 2068

In the last few weeks, Will Elliott had spent many mornings reviewing inventory. Economic problems on Earth had complicated some of Mars's orders for computers, spare machine parts, rocket engines, fuel cells, compact motors, and other high-quality goods they could not yet manufacture on Dusty Red. Powerful software monitored demand and projected when supplies would run out; maintaining three-year supplies of strategic items was proving difficult as Mars expanded and demand grew.

"Anisa," he said aloud to his automated personal assistant. "Have memos prepared to all departments of the Commonwealth reminding them that 'policy requires them to maintain strategic inventory at the thirty-six month level and ordinary imported inventory at the twenty-four month level. The deepening economic and political crisis on Earth makes it essential that the policy be strictly adhered to at this time. The prime solar sailing window opens in January 2069 and lasts through June, so supplies must be ordered in the next two or three months to guarantee their arrival at Gateway in time for the flight season.'

"Anisa, also copy the note to Marcraft, AgMar, MarBuild, MarFab, Margen, Marcomm, Martech, Mariner Hospital, and all borough governments. Add a sentence to them that we strongly urge them to do the same to guarantee availability of needed supplies and that we will follow up to ascertain whether they are doing so. Stick a reminder in the tickle file that we will need a follow-up memo prepared in one month's

time: Monsol, August 20, 2068. Run the memos past Huma for review; she will confer with me and append my electronic signature."

A screen on Will's desk awoke with the image of an older red-headed woman; he changed Anisa's image every few months. "Acknowledged," she replied with a smile. "Shall I also copy Jacaranda, so she can consider a press release to *Mars This Sol* and other media outlets? That would alert other agencies and businesses."

Will considered. "Negative, but add the Mars Chamber of Commerce and the Asteroid and Saturn Commissions to the distribution list."

"Done." Then the screen went blank again.

That got him thinking about how difficult it had become to move Mars in a certain direction. Gone were the sols when the Commander could issue a memorandum to all staff. The planet now had 7,000 people, a growing private sector, and a series of semipublic companies: Marcraft, their space vehicle manufacturing firm; AgMar, their primary agricultural outfit; MarBuild, their principal construction company; MarFab, their largest supplier of metal parts, plastic items, chemicals, and a miscellany of other materials; Margen, their energy distribution utility; Marcomm, their telecommunications company; Martech, their university; Mariner Hospital, their health system. Residents lived in twelve boroughs, settlements with elected local governments; the Marsian flag had a circle of twelve green stars to represent them. Keeping Mars supplied involved a fleet of automated solar sailers that used sunlight to push them and their twenty tonnes of cargo between the planets in six to eighteen months; one hundred fifty of them moved 2,000 tonnes to Mars every year and hauled back a similar mass of gold, platinum group

metals, uranium, plutonium, Phobosian agricultural goods, argon, ammonia, and water. It was a complex system.

He contemplated the accomplishment of the last three decades when his attaché beeped to notify him of an incoming video call. He activated it and saw the face of Jacaranda Nuri, his nephew's wife and his press secretary. "Will, turn on the BBC. President Knight just made a speech at the White House to welcome the visiting President of Taiwan where he referred to a 'nation deserving of full sovereignty and independence' which should 'take its proper place in the community of nations.'"

Will shook his head. "That goes beyond his usual weekly foot-in-mouth."

"That's for sure! The BBC commentator is saying that this must be an intentional, calculated move, but it's not clear whether it feeds his election campaign or is an intentional swipe at China."

"It's hard to see an advantage either way. All these criticisms of the rest of the world produce derision rather than respect for America. And China will criticize right back. They're threatening an export slowdown."

"Well, the Christmas inventory is already on boats or U.S. docks; they can't do any short-term harm right now. It is strange, I agree."

Will considered. "We'll have to get Pete's input about this incident; he's in Washington right now. I think the explanation lies in the 'America-First' culture, and one can't understand it without understanding the media bubble it operates in. There are tens of millions of Americans who ignore other sources of news and trust a small group of outlets, all of which convey the same basic message. Go watch how they cover this incident."

“Ugh. You’re right, there’s an ‘America-First’ media zone and millions live their lives based on its message. Their private schools and churches reinforce it, too.”

“And their strange interpretations of the Bible. We live in a ‘Mars First’ culture, but at least we’re broadly exposed to Earth in all its diversity. Give me a summary of media responses, Jacquie, and be sure to include the America-firsters. We need to make more effort to understand them.”

“Okay. It’ll probably be six or eight hours; I’ll get a couple of interns in our New York and Paris offices to work on it. Bye.”

“No, try to find some in the Houston office. Bye.” Will closed the circuit and turned back to his work.

It was the next morning, rather than six or eight hours, when a media analysis was ready. It showed that the President’s base was solidly behind him and thought the speech was excellent; that a large fraction of American voters agreed with his support for Taiwan and his criticism of China; and that most overseas populations and governments were appalled. “I think we have to be extremely careful making alliances and agreements with the United States,” concluded Foreign Minister Theodoulos, in a video report from Bermuda, where he had set up Mars’s main terrestrial office. “The White House appears inclined to pressure others whenever they can gain an advantage. The U.S. had already said it wants to end joint space missions. I’d worry about energy dependence on them.”

Will turned away from the videomail. “Huma, we need to reassess our ability to store emergency power.”

“Do you think the Americans would cut off our access to nuclear power?” asked Huma, surprised. “Brian would never do that.”

“Brian’s not the President of the United States. When we relied on solar panels we stored methane and oxygen sufficient to generate four months of full power; that could keep us going at half power during a nine-month global dust storm. But with access to New Hanford’s nuke, and demand has gone through the roof. Now we can store a one-month backup supply, which is dangerously low for all sorts of reasons.”

“But we can’t store more. Aurorae’s power demand is peaking at forty megawatts; New Hanford only generates fifty.”

“But our per-sol demand averages closer to twenty-five thousand, so half of New Hanford’s capacity is available if we could purchase and store it. Contact our Ministers for Commerce, Development, and Transportation. I want Henry, Emily, and Moses to meet with me this afternoon or tomorrow. Add Louise Tremblay, because the spaceport has a lot of resources that the others may not be fully aware of. I want a meeting to talk about steps we could take to protect ourselves from a cut-off by the United States.”

“Then you might want Indira as well, since the Attorney General’s Office controls public safety.”

“You’re right, add Indira.”

“What about the President of Margen?”

“Margen generates a little solar and wind power, but they’re basically a distributor. Invite her, but I doubt she can add much.”

“Okay. Anything else?”

Will shook his head. “I’ll send Pete a thank you email; if I say anything other than thank you I’ll copy you. I’ve got an hour for communications before my 10:30 appointment with Moses.”

“Except you have to read the report; budget at least twenty minutes for it.”

“Alright. Thank you, Huma.”

“Thank you, Chief Minister Will,” she replied, and she hurried out of the office.

Will turned to the report first, a summary of the upgrading of Mars’s road system. The Circumnavigational Trail’s section through Noctis Labyrinthus had been closed for almost a year since a robotic truck, negotiating a hair-pin turn on a switchback, had strayed slightly from the narrow road and had slid a thousand meters down the slope, smashing into a thousand pieces. The time had come to upgrade Noctis extensively, but it would tie up two dozen workers two years and cost one hundred million redbacks; field work required a lot of equipment and support and was not cheap. Moses was recommending against a quick fix, even though Noctis would consume a third of his human resources. Will wanted a delay or a partial fix; everyone always wanted to tackle big challenges. He read Moses’s report and considered what to say to the affable but insistent Kenyan.

He was turning to his email when the emergency icon in the upper right corner of his attaché sudden grew large and began to flash red. He pushed it. There was a fire in Bangalore Unit sixteen.

He followed the links to obtain more information. Fire prevention was a responsibility of the borough, not the Commonwealth, but this was a serious emergency; he had to know. Much to his surprise, when he clicked on links he got query windows requesting a username and password, and his did not work. “Huma! I can’t get at the emergency information!”

“What?” She rushed in.

“There’s a fire in Bangalore and I got an automated notification, but when I click to get the details my username and password won’t work!”

“Should I work on that, or get Aurorae control on the line?”

“Work on the problem and hold down the fort, I’ll *go* to Aurorae control to find out what’s happening.”

“You have no jurisdiction.”

“I know, but if this is serious they’ll need authorizations from me for the Emergency Corps.”

“I’ll tell them you’re coming; for all we know, the automated door controls won’t let you in!”

“Thanks.” Will grabbed his attaché and headed out the door.

It was a quick run across Andalus Square to Aurorae Control, which was located underground in the interdomal space between Andalus and Bangalore, a few meters east of the Borough Hall. He hurried into the public access tunnel just south of the hall and rather than turning right into the entrance to Aurorae Control he continued into Bangalore.

He was surprised by what he saw: unit sixteen was emitting a plume of smoke, a shocking thing considering that the unit was supposed to be airtight. Clearly, it no longer was. Several passers by were stopping and staring, shocked.

Will looked at them. “I recommend you keep moving.”

“There’s no alarm!” said one.

“I’m sure there will be.” He looked closely; unit sixteen was supporting the edge of an agricultural terrace and the smoke was coming out right below the top level of

windows. A bad fire could cause the terrace to collapse; enough heat could weaken the dome and trigger a decompression. He hurried back into the tunnel.

When he tried to open the hatch leading to Aurorae Control he was pleased that the computer recognized him and unlocked it. He pulled it open and stepped through the airlock into the control complex. The main control room was ahead and to the right. It was full of anxious people.

Mayor Anne Hollingwood, an Australian biologist who had been on Mars only a decade less than Elliott, was surprised to see the Chief Minister arrive. “Will! I didn’t know you were coming.”

“Huma called to tell you I was. I got a notification of the emergency, but all the links to additional information wouldn’t open with my password.”

“Sorry; we upgraded the software a few months ago. Everything’s under control.”

“Do you need the emergency corps?”

“No, not yet, thanks. We’ve got two constables with breathers on their way.”

Will glanced at the screen on the wall. It was split in half and showed two interior scenes of Unit sixteen, but there was nothing to see because of the smoke. “Are there cameras in any of the flats?”

“There are supposed to be, but they’ve all been deactivated by the owners. These are in the stairwell, which is full of smoke.”

“Any residents?”

“We’ve got signals from two ear pieces, but neither is in their owners’ ears; they haven’t been sending vital signs.”

“No one wears ear pieces any more. Do you know the unit is spewing smoke?”

Anne looked at him incredulously. “What? It’s airtight!”

“Not any more! I went to look and saw the smoke pouring out.”

“Really?” Anne looked at Albert Baert, who was in charge of Aurorae Control, who pushed a few buttons. “We’re getting smoke residue in Bangalore,” he confirmed.

“Look!” exclaimed Tammy Mook. She had switched to a camera in Bangalore; they could now see the smoke.

“Evacuate the dome,” ordered Anne.

“You’ll need the Emergency Corps, this is getting out of control.”

“Can they be under my control?”

Will considered a second. “Done. You guys got the data.”

“Not really,” replied Albert. “We’re still not sure where the fire is. The sprinkler systems won’t come on; they aren’t hot.”

“The fire has to be inside the walls,” exclaimed Anne. “That’s where the electrical wiring is, and there are no sprinklers there.”

“But there’s nothing to burn!” said Albert.

“The pressure envelope is only flame resistant and the escaping smoke tells us it has been breached,” replied Anne. “But let’s not speculate. We’ve got to get an extinguishing system on the fire and people inside to see what’s happening.”

Will turned to his attaché and called Huma. There were two hundred members of the Emergency Corps in Aurorae; they trained at least twice a year to keep up their certifications in various skills. He activated troops Alpha and Gamma, which had fifty each, and set the staging area as Andalus Square. No doubt some were away building

highways or outside doing construction; they all couldn't show up within twenty minutes, as required. But enough would be available.

"Say, does anyone smell smoke?" asked Albert.

Will sniffed. "Yes, it's leaking into our air supply."

Tammy ran a series of checks. "Bangalore's atmospheric circulation system is still connected to Ceylon and Andalus Northeast, so smoke is getting into those agricultural enclosures; from them, it's probably circulating to other agricultural enclosures. And Andalus gets its air from Andalus Northwest, as do we."

"Shut down the circulation!" ordered Anne testily. "That should have been automatic. No air circulation beyond Bangalore for now. Shut off the air circulation between agricultural units. Shift Andalus's circulation to Cathay North and Andalus Southeast."

"I'm doing it," agreed Tammy.

"That's at least the third failure in our emergency procedures," growled Will. "Where are those fire fighters?"

"They're coming now," said Anne. "I've got four constables going through units fifteen and seventeen evacuating anyone in them, and we need your emergency corps to check the other units."

"Bangalore has a lot, too," said Will. "I'm calling the hospital and Emergency Corps Unit Beta. We'll need to house people tonight."

"About one hundred twenty," added Anne.

Will contacted Huma, who had already called the hotel and the Dacha for space and was about to call three construction companies about partially completed housing. He

let her do that and called the hospital, which already had the emergency room standing by; Anne's chief of staff had called them. He called Kent Bytown, head of the Commonwealth Constabulary, who was in charge of the emergency corps and got a quick update. Then he turned back to Aurorae Control.

Two men had gone into Unit Sixteen in special suits with fire extinguishers; unit 16B2's sprinkler system had finally gone off and the firefighters reported some flames and smoke so thick they couldn't see practically anything. The screen on the wall provided an utterly useless gray image; they had to listen to the firefighters only.

Six more men went in with flame suits, carrying axes to hack holes in the inner wall to get at the source. "There's a big pile of paper in here," reported one firefighter named Mehmet. "The unit owner created a little niche in the wall for storage and it seems to have caught on fire."

"Sounds like we need yet another regulation," said Albert.

"I think we have one against that already!" replied Anne. She leaned close to a microphone. "Anyone in the unit?"

"Negative," replied Mehmet.

"All the units in sixteen are empty," added another firefighter.

"I think we've got it now," exclaimed a third firefighter. "But we won't be sure until we get the smoke out!"

"It'll be a while before we can be sure," commented Will.

They listened to the banter of the firefighters as they shot carbon dioxide into the hole they had cut in the wall, then added water once they were sure the electricity had been turned off. Then they waited and watched as Aurorae Control turned on the fans and

expelled unit sixteen's air down a duct and into the Martian atmosphere, replacing it first with a nitrogen/argon mix, then with standard atmosphere drawn from the Ceylon agricultural enclosure. At that point they were sure the fire was out. Will headed back to the Commonwealth Building. Huma and Jacaranda were waiting for him in his office.

"Is the press bad?" asked Will as soon as he saw them.

"The America-first media has jumped on this and many others are picking up their criticisms," replied Jacaranda. "The White House has already issued two statements about the 'unsafe conditions prevailing on Mars,' to quote the second statement."

"Are they trying to distract everyone from the Taiwan statement?"

"Maybe."

"But it's working, Will, because we had a series of failures," persisted Huma. "It sounds like the America-firsters didn't have concrete facts, just general criticisms, but our safety failures gave them the specifics they needed."

"*Mars this Sol* says it took twenty-three minutes for fire fighters to get into unit sixteen," said Jacaranda.

"That sounds about right," replied Will. "We'll need to speed it up."

"I think you'd better say that to the media," said Jacaranda.

"Anne Hollingwood and I had better do a joint news conference within an hour. I don't want to look like I'm taking credit or criticizing her."

"I'll call her right now," said Huma. "The press conference should be held at the Borough Hall on the steps; let the public see it."

"I'll get started on the talking points," said Jacaranda.

It was almost midnight before Will finally got home. When he entered their house he found Ethel busy in the kitchen with Sarah Pannakar fixing sandwiches. When they saw him, Ethel said “do you want a sandwich, too?”

“Please, I’m starved.” He looked at Sarah. “How are you doing?”

“Best as can be expected. I finally got the kids asleep a few minutes ago. We really appreciate the space, Will.”

“Delighted,” he replied, even thought he had been unaware that Sarah and the kids were staying in Marshall and Liz’s old bedrooms.

“When we saw your name on the list of displaced people, we had to offer the flat to you,” said Ethel. “Mike and Liz won’t be here for five months yet. Our house is empty and we aren’t even in here much.”

“We’re delighted to help, Sarah,” added Will.

“Have you any idea when we’ll be able to go back?”

“Everyone in Bangalore can go home tomorrow, except the folks in Unit Sixteen.”

“We were in sixteen, one floor below the fire.”

“I hope you weren’t home when the fire started.”

“No, I was at work at Mariner Hospital and the kids were in school and day care. When the emergency was sounded, we heard about it at the hospital immediately and tuned in *Mars This Sol*. I couldn’t believe it when I saw my building was on fire! We haven’t been able to get into Bangalore Dome since.”

“The fire’s out and the smoke’s cleared from the air, but the smell of fire is still strong and there’s some water damage.”

“Ugh. Just what I need. The twin’s bedroom was right underneath. I can’t believe Javier had created a little storage area for papers inside the wall.”

“And the papers jiggled the wiring, which may have been poorly done. But the bigger problem is the pressure envelope; it burned through very badly. The hole is two meters long and up to thirty centimeters wide. You can’t repair a hole like that.”

“So. . . the unit will have to be condemned?”

Will nodded. “I’m sure a temporary zoning waver can be arranged, but who wants to buy a unit that’s not airtight?”

Sarah closed her eyes. Ethel put her arm around Sarah. “I’m sorry.”

“And we don’t have insurance.”

“No one does,” replied Will. “So I think it’s safe to say that special legislation will be passed. There’s long been a plan to replace the housing in Bangalore anyway. This will accelerate the effort.”

Sarah looked at Will. “How are you holding up?”

“My ordeal’s nothing compared to yours.”

“But still. . . the media has been in a feeding frenzy.”

“Yes, it’s been an exhausting twelve hours. The Americans started it, but the problems with our emergency procedures fed it. The reporters have said again and again that Mars has lost its aura of total competence.”

“Something we never had; we have an accident every few years,” said Ethel.

“But it builds back up,” replied Will. “Basically, I’ve spent half an hour overseeing investigations, then half an hour answering questions from the media, then the investigations, then the media again. . . it has been relentless.”

“I think *Mars this Sol* has rerun most of your interviews,” said Sarah. “I was wondering why, every hour or so, they had a few new sound bites from you with a bit more information.”

“We’ve been releasing stuff as fast as possible; it’s the only way to manage a situation like this. The guys in borough maintenance, who serve as fire fighters as well since they’re available all the time, already have ideas that will cut their response time in half. The Emergency Corps has ideas that can speed their response, and we’ve fixed the software glitches that prevented all Commonwealth personnel from accessing information from the borough’s emergency management system. Plans to improve safety inspections are underway. We’ve already responded quite a lot. I think that’s impressive. This was our first fire, after all.”

“Like Sarah said, every hour a new idea was coming out,” said Ethel. “I think this emergency will fade in the media pretty fast. The United States and China are still making news of their own, insulting each other and threatening each other. That’ll drive this from the headlines.”

“Probably true,” replied Will. “Probably true.”

2.

Demands

Early Oct. 2068

Will had no opportunity to get a good night's sleep; he was up a six a.m. to prepare for a previously scheduled interview. When he got to his office at 8 a.m. he made coffee rather than his usual tea. Before he drank any, Huma called on the intercom.

"Brian Stark just called. He wants to stop by as soon as possible."

"Okay. We have a briefing at 9:30; could he come before then?"

"I'll ask." She put him on hold a moment. "He's on his way over now."

"Okay." Will groaned. Brian knocked on his door two minutes later. "Come in, Mr. Ambassador. All I can offer you is coffee this morning."

"That bad, huh? Coffee's fine. Marabica, I suppose."

"It wouldn't be right for the Chief Minister to drink imported coffee, would it?" He poured Stark a cup of coffee. "Have you tried the new 'Starbucks' imitation?"

" 'Marbucks' with the Spirit of Mars statue on its logo instead of a mermaid? Yes. Flavored Marabica; they stick as little imported coffee in as possible. Not very good."

Will walked over with two cups, the sugar bowl, and creamer on a platter. "I thought you could order a cup of pure Kona, or whatever?"

"Yeah; 100 redbacks for a grande!"

"Ouch. I'll stick to Marabica. How can I help you?"

"Time to reopen the Phobos negotiations again, Will."

“So, America thinks a paper fire inside a unit housing a half dozen people that made a lot of smoke is a moment of weakness.”

“The fire isn’t a factor. We’ve gone over this before. Give us a reasonable sized reservation on Phobos and we’ll build some facilities there that’ll make you proud: a bigger nuclear processing facility, a bigger gaseous core engine assembly facility, and a nuclear reactor able to power Phobos’s future.”

“Phobos has virtually unlimited, cheap, completely reliable solar power, so what it needs is land. We won’t give that away. You’ve already got almost half of Deimos. You can have Phobosian land hectare by hectare as you are prepared to build on it. Your facilities are buried, so they’re perfectly secure even if another facility is fifty meters away. If you insist on building on Deimos where you’ve got plenty of land, your people can always come to Phobos on holiday; it’s an overnight flight.”

Brian considered. “Will, that’s not adequate. There’s no reason for me to raise my voice and rant. It’s not adequate.”

“Brian, deep background: what’s going on?” Will said quietly.

“I guess it can be summarized by this: America’s the greatest power on Earth and it plans to be the greatest power in the solar system as well. Mars is a central player in the exploration of the solar system, so we must have a central role here as well.”

“Brian, the U.S. is in danger of slipping into third place economically because the Grand Union is integrating into a single economy and China’s bigger population gives it enormous economic potential. American universities have been slipping because its high schools are substandard. Too many Americans foolishly think eliminating government

will bring then freedom, when all it brings is the opportunity for a few to crush the majority, which is a most un-American result, don't you think?"

"That's a caricature of the situation, don't you think?"

"Maybe not as much as you think. Look, Brian, the United States has four hundred square kilometers at New Hanford east of here and almost half of Deimos and an exploration station at the South Pole. The Chinese have a smaller reservation at Dawes and almost a third of Deimos, and they've turned their North Pole Station over to us. The European Union has an embassy. The Grand Union has nothing at all. I suggest you point out that the United States is already the biggest power here and that humility and collaboration are the best mechanisms for increasing your influence. We already have some marvelous collaboration involving exploration of Jupiter and Saturn."

"I know, but as the Earth's primary power, we're going to be leading collaborations from now on, rather than just participating in them. That's the policy. And we plan to spend plenty to do it. That's why we need a Phobos reservation."

"Does the White House understand that Marsian public opinion would be incensed—legitimately incensed—by a Phobos giveaway?"

"If you help, we can sell this as mutually beneficial, not as a giveaway."

"Do you *really* think so?" Will stared at Brian

"This is best course for Mars and Mars-U.S. relations."

"I'm afraid no one up here will be convinced of that." Will shrugged.

Brian looked at him for a moment "Okay, Mr. Chief Minister, I'll report your position back to the White House."

“Thank you, Mr. Ambassador.” Will rose from his seat to encourage Brian to do the same. Stark rose and walked to the door; Will did not follow. He watched Brian depart, wondering whether Brian would still advocate for Mars with the White House.

He turned back to his work. Foreign Minister Theodoulos sent a report that contacts had told him the United States was poised to put the screws on Mars because of its apparent weakness. Will recorded a report of his meeting with Stark in reply. Ambassador Islami, who was dealing with NASA, forwarded an email asking for contract for a thousand tonnes of liquid hydrogen in two years to fuel an American mission to Callisto, but demanding a price half as large as the standard contract and considerably below the cost of production. Will advised him not to reply for at least three sols.

Then he was off to the meeting with everyone connected to emergency preparations, two dozen in all. They analyzed the mistakes made in detail the sol before and considered solutions or appointed task forces to recommend actions. A task force was appointed to ask the Marsian public for suggestions via a series of public meetings that both Will and Anne promised to attend.

It was 11 a.m. when the meeting ended. Will needed a mental break anyway, so he headed to the Gallery, Mars’s only “mall”—eight stores and five restaurants. About half of Aurorae Outpost ate there or in the three restaurants lining the edge of Andalus Square. He spotted Sammie Anderson, one of his son’s friends, and sat with him. A few people approached him with questions or comments about the fire and at one point a small crowd gathered to listen to his replies. Then he headed across the square and back to his office. Huma came out of her office. “I called you.”

“Oh?” He glanced at his attaché. “Sorry, I turned off the ringer. I wanted to judge the mood of the public.”

“And?”

“Not bad. People are more concerned about the safety failures than the fire. Getting the information out right away is having its effect; people feel confident the problems will be resolved. They don’t feel we’re withholding anything. Trust has been preserved.”

“That’s crucial, especially when so many life-and-death systems are involved. Speaking of life and death—well, that’s an exaggeration—Mayor Evans of Uzboi called. An hour ago the American reactor there had a power fluctuation and its output was reduced twenty percent, to 80 megawatts. When Rachel called the reactor control room they were vague as to why the power output dropped and when it would be restored. Ataxite processing is reduced.”

“And platinum production. Sounds suspicious to me. I’ll call Rachel.” He beckoned Huma into his office. He sat at his desk and called Rachel Evans, who had been elected Mayor a year earlier.

“Good sol, Will. What’s going on?” she said when she answered.

“So, this is suspicious?”

“Definitely. The guys in the control room may work for the U.S., but they’re Marsians. They hinted that orders had come from New Hanford to reduce power.”

“Interesting. Do you know anyone who’s a friend of the workers? Someone who can sit down over beer with them and get them talking?”

“And you’re a tee-totaling Bahá'í; I’m shocked,” she joked. “I’ll see what I can do. This is a small place and everyone knows everyone. So, what’s happening?”

“I had a meeting with Stark this morning. The U.S. again wants a big chunk of Phobos and they’re promising vast but vaguely defined facilities so that the U.S. can launch a major national effort to explore the solar system.”

“That’ll last until there’s a big economic disruption. They need international agreements to stabilize big projects. Do you think they’re playing hard ball?”

“Yes; this is a different sort of administration. They can reduce our platinum output twenty percent and that hits us hard in the wallet without compromising safety.”

“Yeah. The bastards. Well, how does this sound. With less power available, Uzboi airport will have to reduce silane fuel production, and that means we may not be able to support supply flights to the American South Pole Station.”

“When’s the next one?”

“Two weeks. The flights are rare in the winter; every three months.”

“I suggest you inform the South Pole Station there’s a possible problem. Get *them* to complain to the embassy. But wait until we can verify the reason for this power reduction.”

“Oh, it’s not a technical problem, they said so. But I’ll wait until we get more information, sure. What do I tell the public here?”

“Once we’re sure, talk to Jacaranda. I think we should let *Mars This Sol* know. This will circulate as a rumor pretty quickly. Dust off the solar panels and set them up; who knows how low the reactor’s output will go.”

"Okay. We're certainly not going to concede any of Phobos under these circumstances. I'll let you know once I have more information. Bye."

"Bye." Will closed the connection. He set up a videomail to the emergency supplies task force: Yevgeny Lescov, Henry Smith, Emily Scoville-Rahmani, Moses Waigwa, Indira Kumar, Louise Tremblay, and Huma Mubarak. "We need to meet later," he said. "Let's tentatively say 200. We are ninety-five percent sure the Americans have retaliated against our refusal to negotiate a larger reservation on Phobos for them by reducing the power output at Uzboi from 100 megawatts to 80. That cuts platinum output by half a tonne per sol and costs our income by ten million redbacks. We need to be prepared if this confrontation escalates. We need to store as much power as we can while we have access to it, transfer as much power from the Chinese reactors as possible, and expand solar power farms and wind farms as much as we can manage. Henry, find out the latest about our manufacturing capacity for solar and wind power. Louise, how much power can we beam, and can we expand it. Emily, what conservation is possible. Moses, how much silane can we transport over land. Looking forward to talking soon."

Uneasy, Will turned to his other work; there were reports to read and advice to give. Huma and another secretary came in and they ran through twenty issues, hashed through what to do, and the women left to implement the decisions. Jacaranda arrived and they discussed the media attention on Earth and the strategy to take if the power reduction at Uzboi was intentional; she left with talking points to write up, sympathetic reporters to talk to, and interviews for the boss to set up. Theodoulos and Islami videomailed from Earth and Will replied. By then it was lunch; no time to go out, so Huma ordered sandwiches. Then Rachel Evans called back.

"I can confirm it; the reactor is fine, the power reduction was ordered by the White House. We got someone there to talk."

"Okay. Call Jacaranda; she already has a plan ready to go. You're going to make the statement and answer questions from reporters, with Jacaranda handling any coming this way. We're keeping me in the background; that might escalate things. You're photogenic and articulate. You can express all the outrage you want, just don't call them names. Stress the impact to the terrestrial economy."

"Right. . . okay. If we do that, and not only do we get sympathy, but platinum prices will go up."

"Exactly, and our smaller output will be worth about the same amount. Any idea how many people will be idled? We may need the extra people here."

"I'll work on that. Ciao."

"Ciao." Will closed the circuit and saw Huma at the door; it was time for the big meeting. He walked down the hall to the conference room. "What do we have?" he asked and turned to Henry Smith.

"The situation with solar and wind is complicated. In both cases we have the ability to produce a lot for a short time only, not long-term," Henry said. "The solar array factory currently has a rated output of twenty-five thousand square meters of TCK-organic panels per year; they're forty percent efficient and do well converting ultraviolet. That'll produce five thousand kilowatts of peak power or sixteen hundred kilowatts of average power, averaged over the entire sol that is. That's not much, but if mirrors are used to concentrate light on them the power output can be pushed up twelve-fold, and that's getting into the useful range; half of Aurore's entire annual demand. But while the

factory can produce twenty-five thousand square meters per year, our facilities can produce the organics, plastics, and other chemicals for less than half that. The factory has a three-month supply of materials at full production. There are also twenty-five hundred square meters in orbit awaiting transport to Luna; they could be shipped back down."

"I thought we could make more than that."

"Three or four years ago we were producing fifty thousand square meters per year in order to produce power for Uzboi, but when we switched to nuclear we dismantled some of our production capacity."

"Damn. How much to increase the production of raw materials?" asked Will.

"Fifteen or twenty million redbacks, some imported equipment, a dozen staff, and six months of work."

"And how many square meters of solar panels can we move around?"

"Uzboi had a rated power output of fifty thousand kilowatts, average demand, before the nuke went on line. Then those panels were moved to Jumla and Elysium, and Jumla uses most of them. We also have panels at all other outposts, including here, and at oases. The census reveals we can produce eighty thousand kilowatts, about half using solar power units and half with flat panels. So we have forty thousand kilowatts of average power output—that's six hundred thousand square meters—of panels that are *not* in solar power units, and most can be adapted to be used in SPUs."

Will smiled. "That's our salvation, then; that's more power than we need."

"But it'll take six to nine months to produce the SPUs. The bottleneck is producing transformers to convert the direct current at variable voltage to our standard alternating current. There are also problems with wiring to bring the power in."

“Have them talk to Rachel; Uzboi has spare personnel right now. We can find the money to do the work, but we can’t get imports very fast. Wind power?”

“The bottleneck is electric generators; they have fifty in stock. They could make a hundred wind turbines per year otherwise. Their rated output is 70 kilowatts, but the wind doesn’t blow that fast most of the time, and not at all at night.”

“Moses, how many turbines do we have scattered across the planet?”

“I’ll have to look it up. A couple hundred. But wind power is so unpredictable.”

“I’m mostly worried about dust storm season, but it’s still nine months away. Can we move silane from other outposts?”

“Sure,” replied Moses. “We’ve got twenty tonne tankers that can be pulled by a standard truck at about twenty-five kilometers per hour; pretty slow, but they can get here from Dawes in a week and can get from here to Uzboi in thirty hours. They can refuel en route using the automated systems at the oases, and the oases have enough solar and wind power to refuel a truck every other sol. But twenty tonnes of silane represents one hundred fifty thousand kilowatt-hours of power; in other words, about six thousand kilowatts of constant power for a sol. If the trucks use silane for power, they’ll arrive here from Dawes three-quarters full. And once we get the silane here or anywhere else we don’t have a facility for converting it to electricity. The existing silane motors for vehicles, together, can produce maybe three thousand kilowatts of power.”

“How long to build a silane-powered turbine?”

Moses shrugged, but Louise spoke up. “Six months or so, assuming we can convert one of our ten-thousand kilowatt turbines from methane-oxygen to silane-CO2.”

Will shook his head. “What about beamed power?”

“Our maximum capacity up to Phobos and back down is two thousand kilowatts,” replied Louise. “Divide that in half because Phobos is below the horizon half the time.”

“Damn,” said Will, growing increasingly frustrated. “Louise, how much methane-oxygen can we store?”

“We’re configured for a six-month supply for a ten thousand kilowatt turbine system; that’s two twenty-five hundred tonne storage tanks for methane and two five-thousand tonne storage tanks for oxygen. Give me two hundred workers and we can start a crash program to build a new tank every six weeks.”

“How many turbines do we have?” asked Henry.

“Two in Aurorae and one each at Uzboi, Cassini, Dawes, Meridiani, and Jumla, with a backup unit here. One’s also en route from Earth, for Tithonium,” replied Louise.

“And if the Chinese squeeze us, too, we’ll need every one where it is right now,” observed Will. “This is a very dangerous situation. We’re dependent on the reactors.”

“Could we seize them?” asked Yevgeny.

“That’d be risky; they could be shut down in such a way that we couldn’t turn them back on,” replied Louise.

“They wouldn’t dare deprive us of life support,” said Moses.

‘They don’t have to,” replied Will. “Our seven thousand people collectively need about fifty thousand kilowatts of continuous power demand for life support, but they need another three hundred thousand kilowatts for gold and platinum extraction and manufacturing. Take that from us and our economy is shut down.”

“And our imports and immigration as well,” added Yevgeny. “I just got a call from Martech’s Astronomy Department. They have a grant from the Chinese government

to conduct infrared interferometry using telescopes on Deimos and Olympus Mons, but they're importing a particular infrared instrument that includes parts made in the USA. As of this sol those parts have been defined as strategic and can't be exported. They wanted my help to get the parts on the next solar sailer."

"That won't happen," replied Will. "But as far as you know, the part isn't being shipped because of the Chinese connection?"

"No, because it is strategic; it won't be shipped to Europe, to the moon, to Mercury, anywhere."

"At least it isn't because it's coming here," observed Louise.

"Not yet," replied Will. "Most imported items have parts from several countries in them. If any of our major suppliers halted shipments to us it would cause total chaos."

"Do you think it'll come to that?" asked Yevgeny.

"I don't know. This is a different sort of crisis. Governments are not behaving rationally; they are believing their sound bites and talking points too much. They're whipping up public opinion, then they can't steer it away from the precipice later."

"Very dangerous," agreed Yevgeny.

Just then, an aide appeared in the doorway. "Chief Minister Will, Ambassador Brian is here and he demands to see you."

"Demands?" asked Will.

"Demands. That was his word."

"I see. Very well, escort him in." He turned to the door, as did the others. When Stark arrived he seemed momentarily surprised by the gathering.

"I see I've interrupted a meeting."

“Just the usual partial cabinet meeting,” replied Will. “Are you here to assure me that the power reduction at Uzboi was a temporary glitch?”

“Can you assure me that my people at the North Pole will get their supplies?”

“If Uzboi’s power remains reduced, I can assure you we’ll find the fuel for an evacuation flight.”

“That’ll guarantee their safety?”

“Yes, and it sounds like the folks in Uzboi will be safe, albeit unemployed.”

“They’ll be mostly employed. White House orders. Based on the behavior of the platinum futures market, your revenues won’t drop so much.”

“Brian, are you explaining our position to the White House?”

“I’m doing my best to be a two-way bridge, but policy priorities are much higher than they ever used to be. The U.S. really wants that reservation on Phobos.”

“Have you explained that public opinion would crucify us—probably force us from office—if we conceded?”

“I don’t think they care who’s running Mars.”

Will nodded. “I see. Okay, Brian, anything else?”

“I guess not,” he replied, then he turned and slowly walked from the room.

3

The Yellow Sea

Early Oct. 2068

Liz Elliott-Tobin walked through “HQ,” Concord Station’s main cylinder. She looked at the tables and chairs of the cafeteria, where she and Mike had spent so many hours over the last twenty-seven months, and at the little stage where she and her dance class had performed several times. She glanced into the kitchen where she had done chores and the store where she had bought items almost every day. Passing into the next cylinder, she spied an open examining room in the clinic; she had helped there as well. Concord Control’s basement entrance reminded her of the computers and staff controlling the huge, complex machinery that kept one hundred human beings alive on Mercury.

Then she walked long corridors past doors leading to flats until she reached the flat she and Mike had occupied for the last two years. He was inside, wrestling with a suitcase.

“Did you say goodbye to them?” he asked, referring to several of her students, who had just gotten out of school for the day.

“Yes; we exchanged some tears.”

“It is sad; I’ll miss this place.”

“Two years of our lives.”

“Mercury’s grown on me, and in the last six months there’s been relative peace, too.”

"Exiling the dissidents has worked wonders to the political atmosphere," she agreed. Liz glanced at her watch. "We've got a few minutes yet before we have to head to the garage. Maybe I'll videomail mom and dad."

"Okay, I'll join you. Hard to believe we'll be living in their house in a little over five months."

"It is." Liz pulled out her attaché and punched in a code to record a message to send to Mars. The "record" light turned green on the screen. "Hi, mom and dad. Mike and I have a bit of time before launch, so we thought we'd call and say hello. It's unpredictable when we'll communicate over the next four days. We'll be at Portal in about thirty hours and there's a forty-hour wait before the trans-Mars injection burn, assuming there are no delays. We'll call from Portal. Then the catch up flight and rendezvous takes between twenty and thirty hours. So we'll be on board the caravel *Centaurus* in four days if all goes according to plan.

"We've been reminiscing about Mercury over the last few days, but we're still looking forward to getting home. I videomailed Marshall yesterday and he joked that we were probably safer on Mercury, but I suppose that's just black humor. How's the conflict with the U.S. going, anyway? I'm hoping they'll just drop their pressure tactics and realize they'll never get what they want, but I suppose that's naïve of me. Mike's intrigued by the Marsian peace movement and may join it after we arrive. We were watching the peace demonstration in Andalus Square in front of the American Embassy earlier today. I never thought I'd see something like that on Mars!

"Anyway, email us back. The launch is in four hours, so there's time for us to get it before blastoff. Bye."

Mike nodded a goodbye as well, then Liz sent the message. They spent another tearful minute looking at their two-room flat for one last time. Then they picked up their suitcases and started walking to the garage. They lingered a few minutes in the cafeteria, where a dozen had gathered for coffee—Merabica, a variant of Marsian Marabica, in turn a variant on Arabica—for goodbyes. They lingered in Alpha dome a few minutes to drink in greenery for the last time in five months. It took them ten minutes to walk to the garage, where a conestoga was filling with passengers heading for the Hermes shuttle that would take them to Portal Station, where a solid-core nuclear engine, fifty tonnes of liquid hydrogen propellant, and an interplanetary transit vehicle awaited to ferry them to the caravel *Centaurus.*

Ten minutes to walk two hundred meters: in the same period of time Liz and Mike's videomail flew across the inner solar system at the speed of light, through the solar corona and above the surface of the sun—because Mercury and Mars were nearly on opposite sides of the sun at the moment—past the orbits of Venus and Earth, then through the Martian gravitational sphere of influence to powerful radio receiving dishes in Martian orbit. From them, in a matter of seconds the "incoming message" icon on Will Elliott's attaché beeped.

Will was standing in his office, looking out his window at the small but boisterous demonstration in front of the American embassy. The beep from his attaché prompted him to return to his desk, where he listened to the message. With a smile he hit reply.

"Hi, Liz and Mike! Thanks for the call. Have a safe launch and flight; after all these years I still worry. No, don't worry about the conflict with the U.S. We're fine up here. I'm surprised about the demonstrations, too, but hey, we're a free country. They've

gotten play on terrestrial news. Marshall's just being cynical. At least his flight to Saturn's going fine.

"We can't wait to have you back! We miss you both and look forward to having you home! So take care of yourselves. Bye."

He sent it with a small tear in his eye. He missed his kids; he was proud of them but wished they had stayed home. At least one would be home soon.

He turned to another report, Emily's about energy conservation. They got lazy with power consumption when the big reactors had gone on line; they could save a lot. He dictated some notes to his virtual assistant about conservation efforts to implement and others to study. Then there was a knock on his door. He looked up; it was his next appointment, the Chinese Ambassador, Dr. Zhao Tao.

"Dr. Ambassador Tao, good sol. Come in." For some reason unknown to Will, the ambassador had asked that his doctorate be included in all references to him, producing a rather German-sounding "Dr. Ambassador," but at least he accepted the Marsian style of appending the first name to the title.

"Chief Minister Will, good to see you." Tao entered briskly and offered his hand. Will came out from behind his desk and they shook; a grip that was just right, neither too firm nor too relaxed. The ambassador was very precise in everything.

"Please make yourself comfortable. Tea? I have some excellent green tea from the escarpment." It seemed impolitic to note it was from the Japanese enclosure.

"No, coffee, if you have it."

"Of course." Will had it ready as well and poured a cup, as well as refilling his tea cup. He walked over. "How are you doing?"

“Quite well. All this politics makes it hard to plan for my fall classes at Martech, though; my wife has had to substitute for me, even in the first week of classes.”

“I sympathize. I haven’t tried to teach since a year before independence.”

“I can imagine. Keeping everyone happy takes too much time, even if there are only seven thousand people on Mars.”

“Seven thousand articulate, confident, diverse professionals. It can be exhausting.”

“I am impressed by how well Marsians have handled the crisis. There’s remarkably high unanimity that the U. S. demand for a reservation on Phobos must be rejected. Marsian nationalism is strong. The demonstration outside the American embassy has lasted almost continually for ten sols! I’ve gone to *Mars This Sol* at odd times and have been surprised to see the demonstration line manned all night!”

“People walk by and sign up for a time slot, or spontaneously join for an hour or two when they have the time. Ambassador Stark complained to the Borough Hall that the demonstrators were interfering with the operations of the embassy and they turned him away. He hasn’t tried to come to me.”

“What are you going to do about the flight to the South Pole Station?”

“Our public and private positions are the same, and they are clear: as long as Uzboi operates at eighty percent power the only flight going to South Pole Station will be for evacuation purposes. Half the folks there are Martech researchers, not American employees, but they understand what is at stake. The Americans postponed the flight another week, but that hasn’t changed our view.”

“I’ve come to repeat my government’s support of your position. In fact, we want to offer you backup options. Chinese reactors at Uzboi and Aurorae would provide you with power redundancy in circumstances like these. Our reactor at Cassini was completed a year and a half ago and the reactor at Jumla will be finished in fourteen months. The Americans have started on a reactor at Elysium and Aurorae II is on schedule to start operating next year. We could complete an Uzboi II for you in June 2072 and Aurorae III by December 2074.”

“Interesting idea. What pricing structure?”

“The same arrangement as the Dawes, Cassini, and Jumla facilities, though we would like more subsidy because of the long distances. We could do each reactor for about six hundred million.”

Will tried not to look too shocked; the additional subsidy was not small. “And why should we go in that direction instead of turning to solar, wind, and conservation?”

“Redundancy during the dust storm season. Solar and wind are not reliable and conservation won’t help you maintain gold and platinum exports.”

“I’m not so sure about that; we’re finding quite a few potential energy savings, and the combination of solar and wind work reasonably well with power storage.”

“And I take it you are storing. I understand there’s been a twenty percent increase in power demand at all our reactors over the last three weeks.”

“Here at Aurorae as well. We’re filling everything we can with liquid methane, oxygen, and silane. We’re hauling them to Uzboi and have set up quite a lot of additional solar arrays there, since there are no dust storms expected for eight months. Conservation

at Uzboi and imported energy will push our platinum group metals production back up to almost ninety-five percent of production before the energy slowdown."

"That's very impressive. But I do hope the energy storage at Dawes and Cassini do not reflect a lack of confidence in the Chinese government. There's no way you can haul much of that power to Uzboi."

"We are completely confident China will fulfill its commitments; that is not even a question. But this threat to our society has made us realize how thin our energy reserves have become. All boroughs must have a four month supply of power at full demand; that's the policy. It's a question of safety."

"I understand."

"I am curious, Dr. Ambassador; where do you see the current crisis in Sino-American relations going?"

"Going? That depends on the United States. The Chinese people are united; we will not tolerate a violation of our national sovereignty, physical or verbal. The naval exercises in the Yellow Sea are just the latest example of American aggression."

"Of course, they are a reply to Chinese exercises in the Taiwan Strait."

"We have a right to carry out military exercises there; those are domestic and international waters. The exercises were scheduled months before the American President invited the so-called President of Taiwan to the White House and openly supported independence of that province. We will not be intimidated by an aging superpower. But we will be wise, also; we won't be provoked into violence."

"I'm relieved to hear that, Dr. Ambassador. We are in a delicate position. Our facilities are powered by three Chinese and three American reactors. The reactors breed

plutonium, a highly important strategic material. By treaty, the plutonium is to be used for peaceful purposes only, but those nations could be at war with each other. American or Chinese teams could try to disable each other's reactors or even seize them; we could be squeezed by both sides to ally with one or the other; and even if the U.S. and China remain 'neutral' up here, which is highly unlikely, my public will be deeply worried by the possibility of Marsian plutonium being used in terrestrial weapons."

Tao's face remained impassive. "We are aware of the complications as much as you, Mr. Chief Minister. China is a reliable and loyal partner in the development of Mars, and that's the main point of my visit this sol. You can be sure that our terrestrial foreign policy will not be the cause of war."

"Thank you; I accept your assurance and am relieved by it. Regarding the offer to build reactors at Uzboi and Aurorae, in the future we will only buy reactors that are under our control. We can maintain plutonium extraction contracts with China or the U.S., but we will not have our power sources, our economy, and our life support held hostage to the exigencies of terrestrial politics. We also want reactors as long as their construction costs are less than alternate energy sources plus plutonium sales. We plan to spend two hundred million to upgrade energy production and storage at Aurorae over the next two years, and probably the same at Uzboi. Our plan will be finished by the end of 2070, not 2074. Mars receives trillions of times more solar power than it uses and the units to convert it to electricity are small, mobile, easily replaceable, and can be mass produced. Reactors have few of these characteristics and come with political baggage. So we will have to own reactors from now on."

That surprised the Ambassador. “I had not realized your policy had shifted so much, but I understand your reasoning. I’ll pass your position on to my government. If you want to own the reactors, the cost will be higher; the current price assumes we own the reactors and therefore have guaranteed access to its plutonium.”

“Then give us a revised estimate. I’m glad you came to visit.”

“I am glad for the visit.” Tao finished his tea. “As always, I appreciate your hospitality, Chief Minister Will. I hope the rest of your sol will be pleasant.”

“Thank you.” Will rose and walked the ambassador to the door, shook hands with him again, and closed the door behind him. Then he walked back to his desk and pushed the intercom button. “Huma, did you hear it all?”

Here face appeared on the screen. “Yes, and took notes. So, we will own all reactors from now on?”

“Maybe, after they charge an arm and a leg. Better copy that new policy to the cabinet members and Lal and ask for comments. We can always back away from the position later if we have to, but it makes sense and gives us a new bargaining chip with the United States. What did you think of his comment about the conflict with the U.S.?”

She hesitated. “It sounded like official language to me.”

“Yes, but his emphasis of the unity of the Chinese people was interesting. He’s right: the Han majority is fiercely united against the U.S. It actually undermined his point, in my mind, because it reminds me that the Chinese government, like the U.S. government, has whipped up public opinion and now can’t easily calm it down.”

“I see your point. The confrontation acquires a life of its own.”

“Exactly.”

It was three sols later when a jetwing bearing Ethel McGregor from Uzboi touched down at Aurorae. The flight lasted barely an hour, leaving Uzboi not long after the sun had cleared the horizon. The stop at Aurorae was no more than an hour in length; the supersonic rocket-powered aircraft was heading east to Dawes and Cassini, and for safety reasons it had to reach the last destination at least an hour before sunset.

The craft made its usual bank to approach the east-west runway, giving a brief glimpse of all thirty-six pressurized enclosures stretched out in east-west rows, 1.8 kilometers long and from 100 to 1100 meters wide. From the air the circles of green oasis were a shocking contrast to Mars's usual pinkish-orangish-brownish-reddish-gray. Buildings inside the domes were hard to make out, as they were roofed with gardens as well. The outpost's northeast corner had a patch of gray industrial buildings, their sandbagged flat roofs distinctive from the air. New Hanford was a solitary bubble twenty kilometers farther east-southeast, set in the middle of a featureless plain rent only by an arrow-straight approach road. New Tokyo was a distant patch of green farms and gray buildings in a cluster of twenty small bubbles on the top of the escarpment, separated from the outpost itself by a wild tangle of cliffs, talus slopes, boulder fields, and displaced patches of crumbling rim rock the size of city blocks. A few short stretches of the escarpment access road were visible in the jumble. The rest of the Aurorae Valley was rolling range punctuated by an occasional boulder large enough to see from three thousand meters altitude and by various products of technological civilization: arrow-straight dirt roads; wide jetwing landing strips; round shuttle pads (some occupied by shuttles); scattered tanks of methane, oxygen, argon, nitrogen, and silane; drilling rigs

marking the tops of deep wells; a wind turbine farm covering Layercake Mesa, Boat Rock, and another hill called Fort Mesa; and scattered antennas, dishes, solar arrays, hangers, unpressurized storage buildings, reactor storage bunkers, and other structures. Aurorae Outpost had a substantial impact on the area: escaping water vapor from its square kilometer of terrestrial environments created fogs, occasionally lasting from late afternoon to early morning.

It was home; quite impressive, too, after a flight over a thousand kilometers of total wilderness—craters, dunes, and chaoslands—except for the unmistakable dark gash known as Uzboi Highway. She felt a surge of pride in their accomplishments. Then the jetwing's three powerful silane turbojet engines cut back and the nose suddenly pointed sharply down, replacing pride with momentary fear. They were heading for the eastern end of the runway.

The approach was always frightening; the thin Martian air and the rocket technology for dealing with its aerodynamics took getting used to. The jetwing dropped steeply toward the ground and approached the runway at eight hundred kilometers per hour, the minimum speed at which its wings could keep the craft in the air. Then when the jet was just a few meters above the runway and beginning to kick up dust, the belly-mounted retrorockets came on, pointing downward and forward, burning off their horizontal motion and maintaining a hover above the runway, hurling great clouds of dust into the air. Once the speed had dropped to two hundred fifty klicks the plane settled toward the ground, its wheels touched down, the rockets cut out, and the brakes came on. They stopped fifty meters from a conestoga waiting for them.

In a few minutes the conestoga's airlock docked to the jetwing and the five passengers disembarked with their luggage; eight passengers waiting transport to Dawes and Cassini boarded. Ten minutes later they were at arrival hall. There Ethel got in a robotic taxi that took her home, which was already empty. After unpacking and freshening up she turned to office work. At noontime she walked over to Will's office.

"I was wondering whether you made it home this morning," he said, rising from his desk to hug and kiss her.

"I emailed you; didn't you get it?"

"I've been in meetings and had a lot to deal with. How was the flight?"

"The usual. How are you holding up?"

Will shrugged. "Alright. I miss you."

She smiled. "I've missed you, too." She kissed him affectionately. "This crisis has made chaos and stress for both of us."

"Is PGM production recovering?"

"Slowly; slower than we'd like. The additional insulation on the fractionation towers is saving some electricity and longer production cycles mean fewer down times, but longer ones because of accumulated maintenance. Next week a computer program upgrade should save three percent more."

"Good; they're projecting ninety-five percent production on eighty-six percent of energy supply."

"In another year we might manage one hundred percent of output on eighty-six percent of energy input, but it'll take time to get there. This crisis has a silver lining."

"What's the business community saying privately?"

“They’re grumbling about Phobos costing them money, and they’re worrying that if we close down South Pole Station available power will mysteriously drop even lower. But so far they’re supportive.”

“We’re evacuating South Pole tomorrow. But I doubt the power supply at Uzboi will be affected. Privately: the reactor crew is resisting orders.”

“There’s a rumor to that effect.”

“It’s more than a rumor. I’d worry more about Meridiani’s supply. They just sent a few new workers to Meridiani, probably to ensure the loyalty of the operators there. We’re already planning to haul in silane and methane from Dawes if necessary.”

“It’s so crazy. It’s. . . immoral.”

“And the President says he’s a Christian.” Will shrugged. “If you think Jesus Christ is coming soon, I guess it’s moral to do anything you want. Let’s get some lunch.”

“That’s why I stopped by.”

They exited the office and stopped at Huma’s next door. “Hello Ethel,” she said. “Good to see you’re back.”

“Thank you. It was a long trip.”

“But I guess you maximized PGM production.”

“More or less; I didn’t get much sleep. Uzboi has some good engineers.”

“How are the kids? Will never tells me.”

“They’re fine. Liz and Mike are on an interplanetary transit vehicle that will dock to the *Centaurus* in six hours. Marshall’s running a Prospector-192 telerobotic vehicle in central Xanadu while hurtling through the inner asteroid belt.”

“Thank God. Omar’s supervising construction on Deimos right now.”

“Really? At our station?”

“No; the Chinese facility. They’ll hire a few nationalities after a rigorous security clearance, including Bangladeshis. He’ll be back in three months.”

“You’re taking care of Halima and Abbas by yourself?”

Huma nodded. “Halima’s pretty autonomous, but at twelve she thinks she can do everything! Abbas spends an hour with his dad by videophone at 5 p.m. every sol. I can get nine hours in the office every sol and another two after they go to bed.”

“That’s tough. Life hasn’t slowed down at all for the last three or four years.”

“No, I’m afraid it has accelerated!”

Will took Ethel’s hand. “Let’s go.” She nodded and waved goodbye to Huma.

They walked downstairs and onto Andalus Square. There was a new Japanese restaurant on the square; they could sit in the back pretty inconspicuously, so they headed there and filled their plates at the forty-redback luncheon buffet. “So when will we ever get away?” asked Ethel.

“I booked us on a Caribbean cruise the other sol.”

“No, seriously. Do you think this crisis will abate enough so you can come away with me? The Dacha’s rather boring, but it’s a change of pace.”

“I could probably do a weekend at our flat at Uzboi. We could both do business there Frisol or Monsol.”

“Really? That’d be great.”

“The alternative is a bit slower pace here. The Mariner Philharmonic Orchestra has a concert this weekend and the Civic Theatre’s putting on *Pirates of Penzance* the first two weekends of October. That’d be a lot of fun.”

"Watch out, they may write your character in!"

"I know. *The Mikado* had a caricature of me, but I can laugh at myself."

"And how's Sarah doing?"

"I don't see her and the kids practically at all; with you away, I've been going home only to sleep. But I saw them at breakfast two sols ago and she said they'd be moving into a new flat in Cochabamba Dome in mid November."

"I heard that; I talked to her yestersol. I gather Ramesh has been trying hard to get her to move back in with him, and she's refusing."

Will shook his head. "I don't know. I haven't talked to her about Ramesh. Not since he spread the rumor I had taken her in to spite him."

"He can be very hurtful."

"Mars will always have hurtful people; I'm afraid training, prosperity, and psychological screening won't keep them out."

"Sad but true," she agreed. They stopped talking a moment while they both ate rice. Ethel was about to say something when they heard shouting outside on the square. They both looked up. The few other patrons in the restaurant looked disturbed as well. Then the owner entered from the kitchen. "The Chinese and Americans are conducting an air battle over the Yellow Sea," he announced, his voice filled with excited worry.

"What?" said Will. He pulled out his attaché and punched in a number that connected to the BBC news. The first picture was of the American aircraft carrier *Enterprise* with a huge fire in middecks.

"Oh my God," said Ethel. "That's a new aircraft carrier, isn't it?"

Will nodded. "Commissioned last year. It cost as much as the Saturn project."

They ate slowly, in silence, glued to the screen. Everyone in the restaurant was watching attachés. Details came in slowly amid much repetition and shifting camera angles, including live shots of the aircraft carrier from a private news satellite. Both sides said the other shot first; they were disputing whether the conflict was in international waters or Chinese waters; both sides had a score of jet fighters in the air and had shot down several of the other's planes. Reinforcements were on the way.

"This is very serious," said Ethel.

"As least the fire on the *Enterprise* is probably from the crash of a plane and not a bomb," replied Will. "It looks like a pretty big fire, too." As he said that there was a flash and an enormous billow of smoke on board.

"It just got bigger. If that's the only American aircraft carrier, where will the jets go? I wonder whether they have the fuel to make it to Okinawa."

"We'll find out soon enough. The American and Chinese governments have been whipping up patriotic sentiment for weeks and both have been viewing dominance over the other as a matter of national pride. It'll be hard to back away from this confrontation."

"You're right."

Will looked at his plate. "I had better eat fast and get back to the office. This will have a lot of implications." He started to shovel down his rice as fast as he could. Meanwhile, another explosion roiled the *Enterprise.*

They hurried and left. The protest in front of the American embassy had lengthened so that the chain reached the Chinese Embassy thirty meters away. They chanted "Peace Now!" as they marched.

“Will, Will!” shouted Father Greg Harris, who was in the protest line. “You’ve got to issue a statement about the Yellow Sea battle! Millions of people on Earth respect you highly; you have a very effective voice. You may be able to do something!”

“Greg, I’ll look into that, but first we have to consider what any statements will do to our situation as well.”

“Millions could die!”

“I know.” The pressure irritated him; Ethel felt his tenseness and took his hand.

“I’ve got to ration my comments,” Will said to her.

“I know.”

They walked into the Commonwealth Building. Will was surprised to see a constable at the door; “Kent’s orders,” he explained. Will nodded, wondered what sort of crisis this was. Kent was upstairs waiting for him.

“This looks very serious, so I’ve ordered security precautions. Close your shutters; eves dropping precautions.”

“Eaves dropping?” asked Ethel.

Will nodded and pointed across the square at the American and Chinese embassies. “They both have big communications boxes on their roofs and we recently detected infrared lasers pointed at us from both. They can detect conversations from the vibrations in the glass windows. So we’ve taken precautions.”

“The bastards,” she replied, offended.

“Fortunately, we’ve got some pretty sharp techies up here,” added Kent Bytown.

“More explosions!” shouted Jacaranda. Her office was three doors away, so they walked over. Most of the staff had crowded in. Mars’s Chief Spokesman had five

television screens on one wall carrying live coverage. One showed the *Enterprise* enshrouded in smoke; the other showed a Chinese aircraft carrier smoking. Jacaranda pointed. “The *Enterprise* just had a *big* explosion and a naval expert for the BBC says it seems to be listing, so it’s taking on a lot of water. The Chinese ship is getting pummeled by cruise missiles; they’re stopping a lot of them with their laser defenses, but three have gotten through.”

“Will, could this lead to a nuclear war?” asked Simin Jalali.

“It depends on how rational they are. No one thought World War One was possible because they thought nations behaved rationally. Both sets of leaders see the threat of war as a way to boost their popularity.”

“And neither set of leaders wants to look weak,” added Jacaranda.

“This is dangerous.” Will considered. “Huma, activate phase one of our energy emergency plan. Recall all scientific and construction teams. They are to collect as many solar arrays at oases as possible and bring their nukes to the nearest outpost.”

“What about the five percent energy savings rules?”

Will nodded. “Activate them, too.”

Ethel looked at him. “Will, we have to do something.”

Will looked around; the others nodded. “This war will bring tensions between American and Chinese Marsians,” he said. “We need to call on people’s higher loyalties.”

“A series of statements, then,” suggested Jacaranda. “We’ll get more sound bites that way.”

“I’d invite Roger Anderson and Tan Jen to join you,” added Ethel. Anderson, an American geologist, had been on Mars since 2037 and had served in various capacities;

Tan, a Chinese glaciologist who had been on Mars since 2052, was a member of the Aurorae and Mars Councils. “They’re highly respected in their countries.”

“Good idea,” agreed Will. “Call them, Jacaranda.”

4

Nuke

mid Oct. 2068

For two sols, little work was accomplished on Mars while everyone was glued to the television screens. The *Enterprise* ultimately sank after a lengthy effort to save it; the Chinese aircraft carrier limped into port to undergo extensive repairs. Two Chinese destroyers were sunk as well by American aircraft. The air war destroyed twenty American and thirty-five Chinese aircraft.

A second front opened farther south as Taiwan, pressured by the United States, launched an attack on the Chinese navy, prompting a fierce air war. Since the Americans had already used cruise missiles, the Chinese used them to blast Taiwanese military facilities. They dropped a few on Taipei as well; the Taiwanese retaliated by dropping an cruise missile on Shanghai's downtown.

In such an environment, the joint press conference of Will Elliot, Roger Anderson, and Tan Jen calling for restraint and a cease fire received very little attention, even from Marsians. The United Nations efforts to broker a cease fire made little progress. Both governments, sensing their legitimacy at stake, whipped up popular support through bravado and calls for patriotism.

"The American decision to force Taiwan into the conflict was decisive in terms of their own public support," reported Pete Theodoulos, in a live video that flickered more than usual because of disruptions in interplanetary communications from the war. "Their claims that the Chinese started the Battle of Yellow Sea have been persuasive with the American public, but the American public did not find it a sufficient reason to start a war.

The current Administration wants to 'break China's will,' as one government official commented to a British diplomat a few weeks ago. That quote was reported in the *New York Times,* but Ruhullah heard directly from the executive assistant of the British Ambassador that the Secretary of State said it to the Ambassador himself. The British leaked the quote and the attribution to pressure the Americans. 'Breaking China's will' will require strong support from the American public, and that means the emotions invested in Taiwan must be engaged.

"The only problem is that Taiwan's involvement has aroused the emotions of China's huge and patriotic populace as well. Perhaps the reason the State Department didn't consider this is because the Secretary of State was a Montana cowboy in his younger days. The notion of breaking China's will is absurd; it can't be done. The Europeans are apoplectic at this turn of American policy. I think we can predict economic sanctions—mild ones—against the United States in a week or so. The Europeans have told the Chinese that if they invade Taiwan they can expect economic sanctions as well.

"The Grand Union is much less unified than the European Union. The E.U. is pressuring the Grand Union to follow their lead. But India, which has a strong voice in the G.U., is supporting the United States against their old enemy across the Himalayas, so naturally Pakistan's supporting China. Australia is pushing the G.U. to at least remain neutral or to permit members to take pro-American or, as they prefer to say, 'pro-Taiwan' positions. The Latin Union is largely pro-China. The Grand Union is split, but anti-American sentiment is a bit stronger.

"For our purposes there are two concerns. First, will the conflict jeopardize Marsian facilities? I have not yet picked up any hints that either side plans to tighten the

screws up here. Maybe the U.S. is too distracted to bother about a big Phobos reservation; their space capabilities are about to focus on destroying Chinese GPS satellites. On the other hand, an attack on us won't generate much negative media attention because everyone's distracted right now.

"Second, will the conflict jeopardize imports and immigration? World trade is being tangled in red tape in almost every country. Supply chains are disrupted, production delayed, and prices are rising. International commercial air traffic has dropped everywhere, but especially in East Asia, interrupting the flow of business contacts. Stock markets have lost ten to thirty-five percent of their value. Gold prices are soaring. Platinum prices are flat because an economic contraction shrinks industrial demand. Petroleum prices are rising because war makes supply uncertain. Commercial and government launches to low earth orbit are down; the U.S. has said it will shoot down launches from China, though the Chinese have sent up two crews safely anyway. All these factors will make life on Mars much more uncertain. Over to you."

Will looked at the cabinet members gathered in the conference room with him. "Yevgeny, what's your report?"

"Pete gave me a good segue," replied Yevgeny. "Our Chinese trainees were supposed to fly to our training facility on Hainan three sols ago, but all Chinese commercial air traffic is shut down because of the military emergency. Our two American staffers there, along with a dozen other foreign nationals, took a bus to Hanoi yestersol, and the facility is now closed. The Philippines facility was scheduled to start a major training session in two weeks, but no one can get there from Japan, Korea, Taiwan, or Southeast Asia, so that's been postponed. A group of future Mars residents were

scheduled to fly to the moon next month to start work there running life support and doing construction for six to nine months; their departure looks doubtful. Currency exchange restrictions and flight disruptions have forced the postponement of our session at the South Africa facility; crew from Nigeria, Kenya, even Yemen can't get there. Our Colorado facility is postponing classes because the U.S. is moving into an emergency footing that has disrupted flights and work schedules. It has also lost foreign personnel, who have driven to Canada. It is not at all clear how we will fill 1,850 berths on flights to Mars next year. We may have to send people up late, train them en route, and train them after they get here.

"There are rumors that both the U.S. and China are planning to seize all facilities at Gateway to control gold and platinum imports and requisition the fuel and consumables stored there, mostly by us. We have to decide whether to defend our assets.

"A few days of war have already disrupted months of imports. Orders are blocked because of potential strategic uses; we can buy some parts but not others. Payments are tied up because money can't be transferred. Orders from China can no longer be paid for from Japanese bank accounts. Some American banks are delaying the clearance of large checks because the drop in stock value threatens the stability of the banking system. Latin American exports to Mars that were routed through U.S. spaceports have to be rerouted through Kourou and Alcantara, which means we wait until enough has accumulated or fly shuttles partially empty, raising costs. Contracts with various orbital cargo hauling companies are disrupted and they want us to pay the extra costs. Sometimes the legal department in Houston or Paris can't straighten out the mess because the disruptions prevent collection of the facts!

“This war will block imports, exports, and immigrants partially or completely for several weeks to several years. We have to prepare for the worst.”

“What is the worst?” asked Lal Shankaraman.

“A nuclear exchange that kills tens to hundreds of millions of people, mainly in the U.S. and China, and collapses the terrestrial economy. If half of earth descends into chaos, shuttles may be very hard to maintain and fly, even if we pay in gold. We could see a partial cut-off from Earth for several years, maybe a decade.”

“That would test our ability to survive,” replied Lal. “Our construction sector would have to switch to manufacturing items we could no longer import.”

“Half of the moon and some of low earth orbit would opt to evacuate to Mars,” noted Yevgeny. “Immigration would not be cut off right away. Mercury and Venus would also have to evacuate somewhere.”

“We’d have to consider which outposts to support; Callisto, Saturn, Ceres, Venus, and Mercury would be too much,” said Will. “At the moment, we have two-year supplies of most items, so we are in reasonably good shape.”

“A disruption of the sort we’re discussing is almost too awful to contemplate,” said Simin. “The human suffering we’re talking about on Earth would be calamitous.”

“We might have to evacuate Phobos,” said Yevgeny. “We can’t maintain spaceflight capability for very long without access to terrestrial parts.”

“Simin, the Ministry of Human Services will have to develop a plan to provide unemployment assistance,” said Will. “Henry, what are the businesses saying?”

“The same things Yevgeny reported. They want to order something from Sri Lanka but can’t pay for it with a check drawn on a Japanese bank. They have a back

office in Eritrea to take care of human resources and customer support and they can neither pay their staff nor get service because the Chinese management company can't communicate properly to Eritrea any more. My staff has been working around the clock with our two banks arranging payment for things through our network, since we have far more bank accounts than even our large businesses. Our support services office in Bermuda has managed to stay in good communications with most of the world."

"Yuki, how's our money holding up?" asked Will.

"We have plenty in terrestrial bank, but it isn't in the right account at the right time! Gold and platinum exports reach Earth via direct entry and they'll continue, so we'll have money; we might have more than we can use, considering how hard it's getting to buy and ship things to Mars. My staff has been busy moving money out of China and Japan. The government owns some stock and its value is plunging."

"Louise, how's our energy sufficiency plan?"

"We've got every spare tank filled with fuel, including the shuttles. Our crash program to build new storage tanks is making rapid progress; we'll have a thousand cubic meter tank finished in another week. It won't be insulated, but in Martian conditions that's not a serious problem; we can spray on the foam insulation while we fill it. In the next month we'll recover twenty-five thousand square meters of solar panels from the oases that aren't on strategic highways and they can make twenty thousand kilowatts of power once installed in the solar power units. A massive crash program can install them in a few months, but we'll have to cut housing construction in half."

"Give me the details and set up a meeting of the two of us with the various construction companies," said Will. "Anything else, folks?"

“Regular business?” asked Simin. “The hospital has an expansion plan.”

Will shook his head. “Email it to me and copy the cabinet.” He rose, so everyone else followed. Most began to leave the room, but Simin came to him looking very upset.

“Will, there must be something we can do. We’re talking about a catastrophe—a calamity—of historic portions. Over a billion people could die.”

“I know, Simin, but we’ve already held one news conference and we’re encouraging everyone to talk to their national and local television outlets on Earth. Roger was very eloquent; he emphasized that from a Marsian perspective, this war made about as much sense as a war between Texas and California.”

“We should put more on *Mars This Sol.* We should be reaching out to the BBC.”

“The problem isn’t the message, it’s the medium. There are a million voices protesting this war already; we’re a small contributor. The nationalistic thirty percent of the American and Chinese populations have access to all of these voices already, but they choose not to listen to them; they listen to media outlets that already agree with them. *Mars This Sol* is the worst possible medium for our message; we end up preached to the converted.”

She shook her head. “It’s just that. . . this is unbelievable.”

“Humanity has to learn to regulate itself; otherwise it will keep precipitating its own calamities. Short of an invasion by little green men and order imposed on us from outside, we’ll have to figure it out ourselves. This is the time of human adolescence. But maturity as a species will come; we know that as Bahá'ís.”

“I agree with you, but it isn’t easy,” she replied.

There was a shout from Jacaranda’s office. “A nuclear attack on Fuzhou!”

"Oh God!" exclaimed Simin. They both turned and ran to Jacaranda's office.

It filled rapidly with staff and cabinet members. The five screens all had talking anchormen; only one offered a small live satellite photograph, which showed a black cloud on the Chinese coast opposite Taiwan.

Most listened silently; a few cried. The television stations cut away to the White House, where a bleary-eyed President—it was 3 a.m. in Washington—gave a brief statement that since the Fuzhou naval and air bases were being readied for an invasion of Taiwan and since America's naval and air power in the region was temporarily unable to protect its ally, the United States was taking the unprecedented step of using neutron bombs to defend Taiwan. No sooner had he finished his statement that the reporters announced that a Chinese intercontinental ballistic missile had been launched in retaliation. The Chinese immediately announced that its destination was the San Diego naval facilities.

"That means the four million people in that area have a half an hour to find shelter and pray," said Will.

"This is the beginning of Armageddon," exclaimed Huma.

5.

Gateway

Mid Oct. 2068

The next two days were a nightmare for millions of people on Earth and the thousands of Mars. The destruction of San Diego was followed by retaliation against Dalian, a major Chinese naval facility and a city of five million, which triggered a Chinese nuclear response against Pearl Harbor. That triggered an American nuclear attack on Zanjiang, another major Chinese naval base, which triggered a Chinese attack on NORAD headquarters in Cheyenne Mountain, Colorado. The United States then nuked the principal Chinese space facility on Hainan Island and the Chinese destroyed Cape Canaveral. At that point the United States announced that an invasion of Taiwan would result in a nuclear attack on Beijing and the Chinese replied that nuclear attacks on Beijing, Shanghai, and Guangzhou would trigger nuclear responses against Washington, New York, and Chicago respectively.

That stopped the nuclear exchange, but not the war. Cruise missiles and ICBMs loaded with conventional explosives continued to fly. Dogfights occurred sporadically over the Yellow Sea and Taiwan Strait. More serious for Mars, the United States destroyed the Chinese low Earth orbit facility, so the Chinese took out Pax, the principal low Earth orbit hub for flights to Gateway and the moon, which the United States had seized. China immediately launched a temporary, inflatable station and constantly changed its orbit to keep it safe, while the U.S. commandeered part of JIRPS, the Joint Industrial Research and Production Station, the principal low Earth orbit industrial park,

and moved it regularly as well. Both counties pounded each others' spaceports with cruise missiles and began to destroy the others' communications and GPS satellites.

Over a million were dead in each country. Several million were injured. Tens of millions were displaced. Hundreds of millions huddled in their houses to avoid fallout, causing the economies of both countries to grind to a halt. Stock markets and banks closed to prevent collapses. A million foreign nationals residing in each country tried to flee at once, jamming border crossings. Americans and Chinese fled their own countries as well. Anger at both nations' recklessness caused scores of countries to suspend diplomatic relations and impose trade sanctions, triggering massive economic displacements throughout the world.

On Mars, people anxiously watched their televisions screens, called their loved ones on Earth, and directed their anger at the two embassies, which were soon red from smashed water balloons filled with blood-colored paint. Aurorae's constabulary made no effort to halt the attacks, which were facilitated by the embassies' locations on the outpost's busiest square and Mars's low gravity. Many discovered that if they threw their balloons hard enough, they could coat the mysterious communications boxes on the embassy roofs with paint.

Will rarely left the executive suite on the fourth floor of the Commonwealth Building. One night he went home at two a.m.; the Mars Council was still in special session on the first floor, drafting a resolution condemning both nations. Once home, he immediately got ready to go to sleep. He had just crawled into bed when he heard a loud and insistent banging.

"What's that?" exclaimed Ethel, startled awake.

“I don’t know.” There was another bang. “It’s coming from the airlock,” Will said. The house had two airlock exits, essentially a front door and a back door, the latter located near their bedroom. The airlocks were set up so that either door could be opened easily to allow someone to enter in an emergency, but the inner door could not be opened easily once someone had entered the airlock without permission of the residents of the house.

Will rose from bed and walked to the airlock in his pajamas. He unlocked the inner door by hand and opened it. Inside was Brian Stark. The confined air of the airlock smelled of alcohol. “Brian, what are you doing! It’s 2:30 a.m.!”

“I know, but I have to talk to you.”

“Are you sure? It smells like you’ve had a drink or two.”

“Three. Screwdrivers. A lot of Stolichnaya. No, I still have my wits about me; barely. Let me sit down.”

“Come in.” Will led Brian down the hallway past their bedroom to the family room, where they could sit on the couch. Ethel rose as well.

“Can I get you some coffee, Brian?”

“No, I prefer to be drunk, thank you.” He was slurring his words, but only barely; the alcohol hadn’t completely entered his system. “Half an hour ago I called the plant at Uzboi and ordered them to raise the power output back to one hundred percent by morning. I have no authorization from Washington, but I don’t care. They can fire me if they want.”

“Are you sure you want to do something that drastic? We can manage pretty well on ninety percent power.”

“You’ve done very well, Will. They ordered me to cut Meridiani to eighty percent and Aurorae to ninety percent when you evacuated the South Pole Station, but I stalled them. They’re now busy dealing with a lot of more serious issues.” He shook his head. “Will, my country has killed several million innocent people in a few days.” Brian’s lip quivered, much to Will’s surprise. “Not only has it committed one of the most horrible crimes in human history—a crime that should result in prosecution in the International Criminal Court, after the President gets impeached—but it has destroyed forever its reputation for justice and progress. It is no longer the greatest nation in the world. It has lowered itself into the mud and it will never be clean again.”

“Brian, I love America, too, and I am utterly shocked and revolted by its action as well. This war has been a long time coming. If there’s anything we can hope for, it’s that Americans will learn lessons from this tragedy.”

“I don’t know, Will. How many times will we have to use our power arrogantly on the world stage before we learn some wisdom? This is at least the fourth time since Vietnam.” He began to cry.

Will felt tears welling up in his eyes also. He looked at Ethel, who was moved by the scene and had a tear in one eye. He put an arm on Brian to comfort him. “I’m sorry for the red paint.”

Brian shook his head. “It’ll wash off. Did you know someone pelted me in the back of the head with one of them this afternoon?’

“No, I didn’t hear.”

“I didn’t say anything. I felt like I deserved it. The two embassy staffers have resigned, so I have no one working for me any more.”

“The Chinese staff has been resigning as well.”

“Half the staff at New Hanford’s ready to resign; I’m not sure they could be pushed to cut back on your power supply without severe disruption of the operation. How’s your sister managing?”

Will shrugged. “Hunkered down in her house in Stamford, Connecticut. She wants to go to Bolivia for six months to get out of the troubles; she’s worked there before. But there are no flights. She thought about driving to a friend’s house in Vermont, but couldn’t get gas and her friend isn’t sure she’ll be able to get heating oil, and of course there are runs on the supermarkets so it’s getting hard to buy food.”

“And you can’t get money from your bank account because the banks are shut down. Stores can’t buy goods and trucks can’t buy gasoline, so supplies aren’t being shipped. My brother’s in Vegas and he can’t get any food. They’ve got rolling blackouts, too, because the power grid was messed up, and it’s still hot as hell there.”

“And there’s looting and lawlessness in a lot of cities because of the shortage of cash to buy stuff that’s still available.”

“Pretty soon the U.S. military will have to stop fighting the Chinese and come home to bring order to the country!”

“It’s the same way in China, too, especially in Tibet and the west where the minorities want full independence.”

“I was shocked and touched by the Mars Commonwealth’s contribution of a hundred million redbacks to disaster relief in each country.”

“We’re also sending twenty-five million each to Mexico, Korea, and Japan to help deal with the fallout. Right now we can’t buy anything with the money. The donations don’t amount to much, unfortunately.”

“Those donations were one reason I order the power back on at Uzboi. This is one of the few places where there’s any decency left.” Brian looked at Will. “Listen. In about twelve hours four shuttles are being launched from JIRPS to Gateway. They have orders to take over everything there and kill anyone who resists. The United States wants all the equipment and fuel at Gateway so they’ll control access to the moon and planets and will have a base of operations out of the reach of Chinese missiles.”

“Those are mostly our equipment, fuel, and a few hundred tonnes of supplies.”

“I’m telling you because you have three and a half days before they arrive. I suggest you scatter your assets.”

“How do I know this is true?”

“Will, I swear on my mother’s grave it’s true.”

“You should resign as Ambassador, Brian.”

“Like the three ambassadors that already have? I could, but three quarters of America’s ambassadors are ready to resign. I think some of them are feeding information to the Grand Union. This is an evil administration. Right now the public loves it—Knight will be elected President next month because of his saber rattling—but it can’t survive once the public gets over its shock. You’ve heard of the Air Force unit that refused to be deployed? That’s the tip of the iceberg. Everything will come unraveled.”

“It’s the same way in China, with revolts in Tibet, Shinjiang, and several other border regions. Brian, are you sure of this?”

“I was asked weeks ago to provide any information about assets at Gateway, but of course everything is on websites and they can hack into them better than my people can. I was notified yestersol of the plan.”

“What can you tell me about listening devices and techniques?”

“The box on our roof? The miniature speakers attached to your windows that constantly broadcast white noise have blocked our laser eavesdropping; so has about fifty kilos of paint balloons. We have a listening device in the Foyer outside the Mars Council’s chamber, though.”

That surprised Will. “Alright, we’ll scatter assets. No doubt the military shuttles will capture something, but we can minimize it.”

“They’ll probably be preoccupied by the capture of commercial facilities and maybe the Mercury and Venus Commissions’. L1 is pretty big.”

Will nodded. “Okay. Anything else?”

Brian shook his head. “No. But at least I feel better. I can now go home and sleep off the liquor.” He rose.

“You take care of yourself, Brian.”

“Don’t worry, I will. Good night.” Stark walked down the hall and entered the airlock, then closed the door behind him.

There was silence in the Family Room. Then Ethel said “What will you do?”

“I’ll call Yevgeny, wake him up, and get a plan underway. Our assets need to be scattered right away.”

“Some could go to the Earth-moon L2 point, some to the Earth-Sun L1 and L2 points, some to high lunar orbit. . .”

"Not to mention the L4 and L5 points. His team will figure it out." Will rose and headed for their videophone.

For the next two sols, the Marsian government scattered its L1 assets, the lagrange point sixty thousand kilometers above the moon. "Point" was a misleading term; it was a sphere thousands of kilometers across. From L1, a few tens or hundreds of kilometers per hour were sufficient to send objects drifting to the earth-moon L2 point, sixty thousand kilometers beyond the moon; to the Earth-moon L4 and L5 points, sixty degrees ahead of and behind the moon in its orbit respectively; and the Earth-sun L1 and L2 points, 1.5 million kilometers in front of or behind the Earth respectively, relative to the sun. Semi-stable high orbits around the Earth or the moon were also easily achievable and could be changed constantly. They were all so far from Earth that American radar had limited ability to track objects.

There was an infinity of "places" the Martian equipment and supplies could go. But there were a lot of objects to move: six caravels, a galleon, two tanker farms with a thousand tonnes of oxygen and hydrogen, another tanker farm with a thousand tonnes of water, a station that could house personnel in an emergency, a cargo storage facility festooned with docked supply modules, four solid-core nuclear engines, and three automated space tugs. That did not include non-Martian facilities: the new International Lunar Transit Terminal with its tanker farm and docked lunar excursion vehicles, a facility for the Mercury and Venus Commissions attached to the Martian station that had two dozen personnel on board, one caravel belonging to each Commission, and two commercial "wings" docked to the Lunar Transit Terminal. There were also twenty solar

sailers with huge, four-square kilometer sails of gossamer-thin aluminized mylar floating near the L1 point, awaiting loading or unloading by the tugs.

Will called Commissioner Irina Mukhamadova, the Russian-Kazakh head of the Venus Commission, and initiated a long and delicate videomail conversation about the American plans. It was essential that she was cooperative; her staffers on the interplanetary transit facility could impede their plans. Fortunately Will's old friend David Alaoui served as a middleman, thereby smoothing over the difficulty of getting to know and trust someone when the communications delay was twenty minutes each way.

Elliott and Mukhamadova authorized the commander of Martian operations at Gateway, Mikhail Shtokman, to inform the commander of Mercury/Venus operations there of the situation. The three tugs were fueled and docked respectively to the water tank farm, the hydrogen-oxygen tank farm, and the cargo docking facility; fueled caravels docked to another fuel farm and to the station. The solar sailers were sent in different directions immediately, since their slow movements were unlikely to be noticed.

Twenty four hours after receiving the warning, with twenty-four left to implement the plans and everything moving forward on schedule, Will called in Ambassador Mariella Fsadni of the European Union. "Ambassador Mariella, I wish to inform the European Union of an important development," he began. "And I am hoping that your government can assist us in handling it."

"I'll do my best, Chief Minister Will; what do you have in mind?"

"Yestersol we learned that the United States planned to launch four shuttles with military personnel on a surprise attack to gain control of all the facilities at Gateway. We believe the shuttles left JIRPS twelve hours ago. We have launched a crash program to

scatter our assets throughout earth-moon space and have secured the cooperation of the Venus Commission. We will begin our operation in about twenty-four hours; at 8 a.m. Universal Time, or 3 a.m. in Washington, D.C. At that point there will be inquiries from the lunar transit terminal and the commercial facilities docked to it, and no doubt the United States will intercept the communications. The cat will be out of the bag."

"And what are you requesting?"

"We would prefer that someone else announce the American plan; anything that angers them will jeopardize our electrical supply. The European Union or the Grand Union, with their various national intelligence agencies and their neutral position in the current war, are in a perfect position to expose the plan."

She nodded. "Why haven't you informed the lunar transit terminal?"

"Our first concern has to be our own facilities; our second has to be keeping American anger at us minimized. If we inform the Lunar Transit Terminal, there's a good chance the news will leak, and if the Americans capture the terminal it will give their operation something. But if the European Union informed the Lunar Transit Terminal, we will be clean and the Americans might not get anything."

"There isn't much time, though; the Americans will arrive when? Two sols?"

"About that. Maybe less. We have no way to verify their departure."

She nodded. "I can't promise anything, but this sounds like something we would be willing to do; it protects an international asset from illegal seizure, protects the moon from American domination, and foils an aggression. Besides, we're mad as hell at the United States and would like to do something concrete to oppose them."

“Exactly. We really need your help. If there’s any organization Mars would join, it’s the Grand Union! It’s the kind of international organization we naturally favor.”

“Of course. I’ll take this to the European Union; they can always pass it on to the Grand Union. We may be able to verify the American launch.”

“How?”

“Our deep-space communications system might be able to intercept their broadcasts. Otherwise we might ask the Chinese; they’re the only other superpower with deep space radar, and they’d want to stop this.”

“That occurred to us as well, but we don’t want to play one against the other.”

“No, that’s biting the hands that feed you.” Mariella rose. “Anything else?”

“No, that’s it. We appreciate your help.”

“I’ll let you know what happens.” She nodded a goodbye and left.

The long, suspenseful wait began; twenty-four hours of checking engines and uploading command sequences. An hour before the engines fired, the European Union announced that the Americans were planning an attack and publicly informed the Marsian government, including the specifics of the trajectory of the American shuttles. The Lunar Transit Terminal immediately made plans to push itself and its fuel tanks out of harms way. They called Martian Gateway Control and discovered they were already moving their assets. Shtokman gave then quick advice and an hour before the Americans arrived, the lunar facilities moved as well.

The American shuttles reached an L1 occupied by a few old ion engines and some satellites. They deployed there while radio telescopes were commandeered to search for the escaping equipment.

Three sols later, Will got an unusual call. “Colonel Sean Manning at New Hanford is on the line,” said Huma. “He says he is America’s new ambassador to Mars and he is requesting you come to New Hanford immediately for discussions.”

“Who does he think he is, summoning the head of state to him? If he’s the new ambassador, he should come to me and present his credentials. Tell him we’ll be glad to make an appointment for him to see me here in my office.”

Huma hesitated. “Maybe I should add you’re busy.”

“No, don’t add that. Tell him if he wants to talk to me, he can come here. And ask him what happened to the old Ambassador.”

“Okay.” She closed the line. He didn’t have long to wait; in a matter of seconds Huma said Manning was on his way.

The colonel was a tall man on a planet of people of average to short height; only in the last few years, the height requirements for transit had been eased. Forty-two years old, he had prematurely graying reddish hair and intensely blue eyes that matched a powerful personality and intellect. He had been accompanied to Mars by his wife and two adolescent children, one of the first complete families to immigrate. “Good sol, Mr. Chief Minister,” he said cordially as he entered the office.

“Good sol, Colonel Manning; or should I call you Colonel Sean?”

“Call me Ambassador Sean.”

“Have you a letter or some other document indicating you’ve been appointed?”

“The documentation is coming; during a war situation we can’t always do business as usual.”

“What happened to Ambassador Brian?”

“He is no longer serving in that role. He’s at New Hanford.”

“And when did the transition in roles occur?”

“Since the last time you saw him.” Manning’s voice rose slightly. “We’ve traced the leak about our Gateway operation from the European Union and the Chinese back to Mars. Did Ambassador Brian tell you about it?”

“Colonel, we were shocked when we were informed of the operation. Who informed us is quite irrelevant and none of your business. The United States launched an aggression against Mars and we lodged a vigorous protest with Ambassador Brian. Under most circumstances your government’s operation would be considered a declaration of war. Mars has taken reasonable and peaceful measures to protect its assets and expects the United States to respect those actions.”

“Mr. Chief Minister, our nation is in a fight for its very existence against an enemy that has killed a million Americans. Such a circumstance calls for extraordinary measures. We are determined to deprive that enemy of strategic assets, and two thousand tonnes per year of gold and platinum-group metals from the moon and Mars constitute a strategic asset.”

“I have no control over the lunar exports and L1 is irrelevant to them. Anything we launch into space this sol won’t reach Earth for twelve to fifteen months and Gateway has nothing to do with them either.”

“Will you stop exports to China?”

“If we do, we will also stop exports to the United States, because we are neutral in this ridiculous, childish war.”

“Sir, you dishonor the memory of a million people who have died!”

“No, sir, *two* million innocent human beings have died, not one million, and forgetting the other million is a true dishonor. From up here, a telescope cannot reveal national borders; we see one cradle of humanity, and we love that cradle. On Mars, Americans and Chinese get along fine and are building a common future together. It is politics as much as culture that divides them on Earth. Our interest lies in a humanity that lives in peace and prosperity under democracy and the rule of law, for that is what will benefit everyone the most, us included.”

“Mr. Chief Minister, right now what will benefit Mars the most is the preservation of its electrical supply. Theoretical discussions about a lovey-dovey future for Earth are not relevant at the moment.”

“Our electrical supply is part of a reciprocal agreement that includes the granting to various nations of reservations on Mars and Deimos. I would not advise anyone to undermine the basis for that agreement.”

“Mr. Chief Minister, I reiterate, Mars’s electrical supply is in jeopardy if it does not cooperate with the United States. That cooperation must take two forms. First, ending all exports of precious metals and space services to China. Second, immediately providing the United States access to supplies of fuel and consumables formerly at L1. These are essential and non-negotiable minimums in any cooperative relationship with the United States. The alternative is to be perceived as having chosen the wrong side in the current conflict, and that choice will carry grave consequences.”

“And I reiterate my point that our electrical supply is inextricably connected to the grants of land for exclusive use by the United States. Your reactors provide us with less than half of our total electrical supply. We can replace them in a year with solar

power units and wind turbines; we already have enough solar panels. While we will suffer grave economic dislocations during those two years, we already have on hand the supplies we need for those years. But if your country pursues the course of action it contemplates, it will no longer possess the right to facilities at either New Hanford or Deimos. Furthermore, a large fraction of your engineers and scientists will stay on Mars and contribute to any nuclear programs we choose to initiate. I would advise the United States against any hasty and short-sighted action."

Sean seemed to hesitate; he was digesting Will's reply. Then he looked at Will's hutch with its coffee and tea. "I'm afraid you've missed your chance to provide me with hospitality, Mr. Chief Minister. I've got to go. You have until midnight to think about the situation." He rose from the table, nodded a goodbye, and walked out the door.

Will followed him to the door and watched him walk down the hall. Huma hurried to Will's office. "Now what?" she said.

"Summon the energy task force and Jacaranda; it sounds like we'll be cut off at midnight. We're in a good position for a few months, but I'm not sure after that. And summon General Bytown."

" 'General' Bytown?"

"Yes, General Bytown. The Emergency Corps and national constabulary together are our national guard and he is the chief of staff. We'll need to consider the defense of our own reactors and solar power systems. I need Indira too; as of midnight, all U.S. government credit cards must be inoperative and all their bank accounts on Mars must be frozen. American-owned surface vehicles are immediately to have no access to refueling, which means they won't be able to travel to other outposts. American shuttle flights are

now grounded here and Deimos. Indira's staff must call all commercial outlets that provide consumables; starting immediately, no one can buy food for consumption at New Hanford. If we have no power, all our airlocks will be closed to them."

"You mean no going back and forth?"

"Exactly. Any staff here and will not be able to go there tomorrow morning."

"I suppose that will be true of Omar and his construction staff up on Deimos."

Will nodded. "They may be stuck on Deimos for a while. We may divert them to expansion of the moon's ability to beam microwave power to us."

"Manning's family is here in Aurorae."

"That's too bad, isn't it? No power, no transportation."

"If they're going to play hard ball with us, we had better play hard ball back."

"Exactly. Right now, that's all the current government understands."

7.

Blackout

Late Oct. 2068

Later that sol there was nearly a fistfight at the Cochabamba Terminal when two constables blocked New Hanford's quartermaster from hauling 100 kilograms of food and other supplies to the American nuclear reservation. He was assured that the supplies would be released the next sol; a protest by Ambassador Manning was acknowledged. He had already made three trips earlier in the sol with a hundred kilos each.

At midnight, as Manning had suggested, the power coming to Aurorae from New Hanford began to drop, and in two hours it stopped entirely. In the middle of the night the outpost needed relatively little power; its fuel cells and generators kicked in to replace the lost supply. Will immediately went live over *Mars This Sol* to announce America's completely unacceptable demands, America's response to the Marsian refusal, and Mars's actions against New Hanford and Deimos.

When Will awoke at dawn, after four hours of sleep, he washed and dressed as fast as he could in order to get back to the office. Outside the house's back airlock, the tunnel was illumined at the level of the terrestrial full moon, but as soon as he entered a few LED panels began to glow dimly; two thirds of them remained turned off. Energy savings had begun. He entered the Gallerie quickly to get a little breakfast and found it unusually dark as well. "Mr. Chief Minister, how long do you think this will last?" asked the young man in line behind him. Will looked at him.

"You're Pedro, right? From Bogota?"

"Yes, you have a good memory! Pedro Flores-Lopez."

“I remember we talked at Deimos, six months ago. I have no idea how long this blackout will continue. We’re placing solar panels in solar power units as fast as we can. That’s allow us to concentrate twenty times as much sunlight on the panels as Martian normal, and in an emergency like this we can make solar power units pretty fast. So we’ll have power to meet basic needs.”

“But what about power for manufacturing? I suppose I shouldn’t worry about losing my job; the general uncertainty worries me more.”

“Me, too. We have to shut down some manufacturing and construction and shift people to other tasks. We can keep people working; if nothing else, Aurorae needs a lot of public works. But there will be dislocation and hardship. The alternative is to be forced to support one side against the other in a war that has no justification or purpose.”

“Oh, I agree!” Pedro acknowledged.

It was Will’s turn in the buffet line. He took pastry, yoghurt, and fruit, poured a coffee, and went through the automated paying line. Heading out of the Gallerie, he passed Mrs. Vera Manning coming in with her two sons, aged 10 and 13. “Chief Minister Will, is it true that my husband is now stranded at New Hanford?” she demanded.

“If personnel at New Hanford want to leave and come here permanently, we may accept them. And if families here want to move there, perhaps we could negotiate it.”

“But what will they eat! This is an unacceptable situation! It is not humane!”

Will pointed at the darkened ceiling. “No power, no food. It’s very simple.”

“Dr. Will, if Mars would support us in the war, all this would be unnecessary!”

“Never!” exclaimed two bystanders nearby who overheard her comment.

“Mrs. Manning, when the history books of this era are written, the United States will not be viewed positively. It grieves me to say that, but I am afraid it is true. Mars cannot join an unjustified war. We will tighten our belts and rebuild our energy system without American help and the United States will be the loser. The Marsian people have the will to remain unbowed and the ability to recover quickly. Wait and see.” He out of the Gallerie, surprised by the vehemence in his remarks and the cheers of the bystanders.

Six constables armed with tazers stood guard at the entrance to the Commonwealth Building. The building was dark inside. Huma was already in; he stuck his head into her office. “Did you sleep?” he asked.

“Four hours. I skipped breakfast.”

“Here.” He handed her the rest of his pastry. “I know you like this kind. Any news from Omar?”

“He’s safe on Deimos; the day shift is not going to the American facility.”

“Developments?”

“Louise wants an appointment. With two hundred workers, she can set up all the solar power units in three months.”

“She can have them; we’ll issue an executive order to that effect. I want to see her this morning, and I want to see the Chinese ambassador.”

“I’ll ask him to come down. Kent’s waiting in your office to see you.”

“Thanks.” Will walked to his office. Kent was sitting and sipping tea. “Good sol.”

“Good sol. I cleaned out your tea pot, filled it with water, and made myself a cup while waiting.”

“Thank you.” Will hung his “medora,” a Martian fedora with a wide brim and thick radiation-absorbing layers, on a hook on the wall and sat at the table. “What happened this morning? Anything?”

“We’ve got people in Cochabamba Terminal arguing with the constables; they want to go to New Hanford! They’re threatening to picket this building. But a lot of the workers just shrugged and headed home.”

“How many people do they have?”

“I’ve got four people going door to door asking who’s home. The day shift is replaced by the night shift at 7 p.m. Last night they implored as many day shift folks as possible to stay, and maybe a third did. Those are the die-hard patriots. But even many of their committed staff are here because their families are here.”

“So, New Hanford has maybe fifty people?”

“Something like that; half the usual daytime complement. They had to shut down the heavy water plant. The water pipeline ran dry about 3 a.m.”

Will shrugged. “We have enough water for a thousand years. I saw the guards outside the Commonwealth Building. Yo’ve raised the security level.”

“Yes, we don’t want their committed staff who are stuck here to make trouble. We’ve got a dozen Emergency Corps personnel in three rangers suited up and stationed just outside Cochabamba Terminal. They’ll be relieved every six hours. A dozen are on standby in each of the two terminals, there’s a dozen here in Andalus, and two dozen more are deployed in groups of four in various domes. Another hundred are on call and can be ready in ten minutes. A defense is prepared.”

Do you have cameras trained permanently on their facility?”

“Yes, a long-range camera up on the escarpment is pointed at New Hanford night and day and a computer’s programmed to monitor it for any movement.”

“Do we know whether tazers will work through pressure suits?”

“Their effectiveness is greatly reduced. My worry is that they might have firearms. A Martech engineer has offered to make us crossbows.”

“Let’s not go there unless we have reason. Any trouble on Deimos?”

“No. It was easy to stop the day shift from leaving for the American base this morning; they’re all contract workers and loyal Marsians. We plan to employ them expanding the microwave transmitters so Deimos can beam down more power.”

“Any trouble at Meridiani or Uzboi?”

“Indeed! There was a fistfight in front of the Meridiani Control Room’s doors when the shift changed there. There was shouting and swearing at Uzboi, caused by a lot of unemployed platinum workers, young and strong and angry. We won’t have any trouble recruiting guards. The reactor control area has a bathroom, but no kitchen or food storage area. I don’t know how long they’ll hold out.”

“As long as they don’t destroy the reactors. What about communications?”

“By the end of the day we’ll have taps installed on the microwave link between here and New Hanford, which will enable us to eavesdrop on communications going over it and block it entirely if necessary. We’re reprogramming our satellites; in a few hours they’ll deny New Hanford access. We can’t block New Hanford’s direct communications with Deimos or Earth.”

“Understood, but without access to our system, communications will be possible only when Deimos or Earth are in the sky, and the bandwidth will be sharply restricted.”

"Yes, to email and a little videophone and television. If they want to communicate with people in Meridiani or Uzboi, or even to family and friends here in Aurorae, they'll have to send an email to Earth and have it sent back here via our system. We have such a huge communications volume, it would probably slip through."

"Understood. My purpose is the pressure them. If they're not going to give us power, we're not going to give them anything at all."

"So, the hundred kilograms of supplies for New Hanford are impounded?"

"Yes, along with all their bank accounts. Any idea how much food's there?"

"No, but we might be able to interview some sympathetic workers. We'll get to that when we can." There was a rustling at the door; Jacaranda was standing there. "I'll call or drop by if I have anything else."

"Thanks, Kent."

Bytown rose and headed out the door while Jacaranda entered. "The media coverage has been highly sympathetic," she reported. "And fairly extensive; the thought of us suffocating in our darkened domes has given the story an edge. I need you to do a press conference this morning; say, 11. The talking points are ready."

"Alright. What other news are we competing against?"

"Some big stories. The Chinese have pulled their troops back from the Taiwan Strait, suggesting they won't invade the island. There were demonstrations in Shanghai; they're angry so many people have died without a victory. The Knight administration is portraying it as an American victory, but the American media—including the America-first outlets—are asking whether one million American lives were worth it to save

Taiwan from an invasion that was never intended in the first place. The conflict is beginning to consume the players."

"Anything else?"

"You'll need makeup before you go on camera. You have dark shadows under your eyes."

"It's called lack of sleep."

"But let's not look it."

He nodded; she stepped out. Will sat at his desk and looked around, digesting all the information. His videophone rang. "Thanks, the two hundred workers are the key," said Louise.

"What's our status?"

"We've got 25.2 megawatt-months in storage, which normally would last one month. Solar and wind power output per sol averages ten megawatts, which is sufficient to keep life support going and illuminate homes and offices. The rationing plan calls for minimal use of stored power to meet manufacturing and commercial power needs. With two hundred workers building SPUs, I should be able to meet our normal power consumption in two and a half months. But dust storm season's seven months away and we'll need at least fifty megawatt-months of stored power by then."

"Based on the plan, what will be our economic productivity?"

"Aurorae's average this week will be sixty-seven percent. People will be under employed. We can raise the average to eighty percent next month, then we can start building our cryogenic storage. I doubt we can reach one percent before next summer."

"What about Uzboi and Meridiani?"

"Have you any sense how long the Americans there can hold out?"

"No. We have to assume they can hold out indefinitely, or will destroy the reactors."

"The three Meridiani outposts can meet basic outpost power needs without the American nuke and without dipping into stored power; they produce an average of one megawatt via solar. We can't get them SPUs for at least three months, so gold production will be dependent on imported silane and methane/oxygen from Dawes. The mining companies will move as many folks and as much equipment to Dawes and Cassini as possible and boost gold production where there's Chinese power. Jumla is preparing to receive people and produce more gold based on the solar power it has.

"Uzboi's in the most trouble. Over the last month they used up some stored power and they have few solar power units. Jumla is shipping spare panels to Uzboi and both Phobos and Deimos will beam down one megawatt. But three quarters of Uzboi's 700 people have to leave. They're going to Dawes and Cassini and we have to find them lodging and work there. You've got to make sure the Chinese give us power."

"I'll meet with Ambassador Tao this morning. Anything else?"

"Nope. Sorry to bear the bad news."

"I'm getting used to it. Thanks, Louise."

"Bye." She closed the line and Will turned to his yoghurt and now-cold coffee. While eating he read emails. Yevgeny had emailed at 6 a.m.; one of the American shuttles at L1 had set out in pursuit of their water tanker farm, which had the least maneuverability of all their assets. The shuttle would probably capture the tanker farm and accompanying caravel in about a week. Will emailed back *Warn them that we will*

point the caravel's engines at the shuttle and fire them. If they approach we should fire a warning shot. If they continue to close, send the caravel on its way and vent the water. We should deny them access to a strategic asset that will be used for a military purpose but let's avoid loss of life. Then he sighed and finished breakfast while contemplating the sad thought of a space battle that could disable spacecraft and result in the slow death of personnel with no hope of rescue, the anger and tension between governments that could result, and a thousand tonnes of water dissipating as a cloud of evaporating ice particles somewhere in cislunar space. He had to wonder whether there would be fuel next year, when 1,800 people were scheduled to head for Mars. That looked less and less likely.

Then Huma called on the intercom. "Ambassador Sean is on line 1."

"Put him through." Will braced himself for an unpleasant conversation. A moment later, Manning's face appeared.

"Good sol, Mr. Chief Minister. Your response surprises me. You must resume access between our facilities and yours immediately or there will be serious consequences."

"I believe your decision to cut us off from our power supplies here and at Uzboi and Meridiani has already triggered the consequences, Mr. Ambassador. The Mars Council will meet later this sol to discuss a bill that will revoke the treaties that gave the United States its two reservations. The Constitution gives me a month to sign a bill or veto it, and I will sign that bill before the month expires. If I sign it, all current arrangements will have to be renegotiated and we will not be inclined to be generous. Your actions may cost us twenty billion per year in lost exports, not to mention discomfort, economic displacement, and ill will."

“Mr. Chief Minister, I implore you. Be reasonable. We are engaged in a life-and-death struggle against an enemy of great danger to the interests of the United States and to civilization itself. Neutrality is not an acceptable position when it includes exports that aid the enemy. You are putting yourselves in a state of war with the United States.”

“The United States has launched an unprovoked attack against our assets at L1 without even attempting to negotiate with us. What sort of behavior is that for a great nation? What actions, sir, endanger civilization more than self-serving aggression? We have been trying to negotiate with you for over a month, but your terms have not been reasonable. The very same attitude manifested toward us caused the conflict with China. No, sir, we will not capitulate. We have enough power to manage and we will build ourselves back to energy independence without you. Within a month you will be running low on food and you will lose your legal right to the land you stand on. And it is already too late to go back to the old status quo. We will be formulating our position for a new arrangement in the next few sols once the emergency lessens. We look forward to hearing from you when you are ready to talk.”

“I see. I’ll convey that to the White House, Mr. Chief Minister. Good bye.”

“Good bye.” Will closed the circuit about the same time as Manning did. The anger in his voice was unmistakable. He had just created policy, but his cabinet was not likely to object; no one would want to return to the status quo.

Dr. Zhao Tao arrived half an hour later. He was dressed impeccably, as always, and wore his always-perfect face. Will rose to greet him. “Good sol, Dr. Ambassador. I already have your coffee ready.”

“Thank you, Mr. Chief Minister.” Tao shook his hand warmly and they sat at the table together. “My government has asked me to convey to you our deep sympathy for all the difficulties you face right now.”

“Thank you, we greatly appreciate the sentiment. We have been moved by the scenes of terrible suffering in China; far worse than anything we are dealing with here.”

“We are deeply touched by the Marsian people’s gift of a hundred million redbacks to the disaster recovery effort. It’s a very generous response for what is really a small country.”

“A seventh of our people are from China; we feel the suffering very personally. Mr. Ambassador, I thought I’d offer you a briefing of the situation. I’ll be briefing the European and Indian Ambassadors later this sol as well. The best way to maintain a strong relationship is with strong communication.”

“Quite true.”

“As you know, we maintain energy reserves and over the last month we built them up, so we were not unprepared for this. Aurorae is in reasonably good shape; our solar and wind power production and cryogenic reserves are adequate to maintain life support plus sixty-seven percent of our economic output. In three months we’ll have Aurorae back to normal power; Uzboi and Meridiani will take a year more. Over the next two months we will evacuate three quarters of Uzboi’s residents and mothball most of its platinum production facilities.

“Our responses to the power shutoff are measured. We will provide no shuttle flights, which means no American plutonium, enriched uranium, or deuterium will be leaving Martian space. No fuel will be provided to flights destined to deliver American

astronauts anywhere in the solar system. No fuel will be available to them from our L1 supplies; we will destroy supplies rather than allow their capture. No ground transportation to or from New Hanford is allowed. Their access to our communications will be cut off shortly. Their Phobos and Deimos facilities are receiving no guest workers, but since they haven't given us any trouble, they can still receive food from our stations if they request it. If the Americans persist in denying us power, we will cancel the New Hanford and Deimos treaties."

"And they will have no lease on the land?" asked Tao, a bit startled.

Will nodded. "Correct, which means they will have to renegotiate everything later. It is not clear to me why the White House has viewed us as helpless. We are not dependent on them and will adjust to loss of their power. The Marsian people show no sign of capitulation; if anything, they are more determined to maintain their independence and neutrality than ever."

"What about fuel for our flight to Jupiter?"

"We will fulfill our contracts."

"Excellent. You can count on us to fulfill our legal obligations, Mr. Chief Minister. Of course, we are in a fight for survival, and the Chinese facilities on Mars have a role to play in that fight."

"As a neutral nation, we are continuing to trade with China; gold and platinum-group metals will continue landing in the Chinese desert; Chinese uranium, plutonium, and deuterium will continue to be exported."

"Our treaty specifies that Martian nuclear materials cannot be used for military purposes."

"That is correct, but anything exported in the next few months will not reach Earth for over a year, and I hope the war will be over by then. It is not clear to me that my government can effectively protest any use of nuclear materials that are already in Earth orbit, by China or the U.S. We can't keep track of them."

"We have no facilities in Earth orbit for creating nuclear weapons and we would not bring Martian uranium and plutonium to China for manufacturing nuclear weapons. But one could envision nuclear engines in Earth orbit being used to power missions and weapons against enemy satellites."

"We all regret greatly the destruction of satellites, whether they are American or Chinese. But I do not see the efficacy of my government protesting the use of Martian uranium for such purposes. But our civilian population may protest actions of that sort."

"As you say in English, one has to be careful about biting the hand that feeds you." Tao's tone was ominous.

"Yes, and we have enough trouble of that sort already."

Tao nodded and changed the subject. "We are formulating a proposal for your consideration to build a pair of pipelines from Dawes to the Meridiani outposts to carry methane and oxygen. A Beijing firm has developed an automated pipeline welding system that could be adapted for use here and Uzboi's nickel-steel production could produce the pipes at a reasonable cost. We think you could import and install the system for two billion redbacks. Eventually all the major outposts could be connected and power could be shipped long distances very easily. It would also open up large areas of the planet to routine commercial development."

Will was surprised, but wasn't going to voice pessimism about an enormous project that had little use except in emergencies. "By all means, we'd welcome the proposal. We've considered pipelines before, but it was premature."

"Perhaps the time has come." Tao rose. "It sounds like your measures will be effective. Please keep us informed. I assume some of the evacuees from Uzboi will go to Dawes and Cassini."

"Both of those outposts will see growth. Your reactors are part of our temporary strategy to adjust for the power loss."

"We are pleased we can help, then." Tao rose. "Best wishes, Mr. Chief Minister."

"Thank you." Will rose and shook his hand, then escorted the ambassador to the door. Huma came in. "At least he didn't threaten to turn off his reactors as well."

"That would not be in China's interests. America's Marsian facilities are neutralized and will probably be abolished; China's are safe. If America attacks our outposts, we will be forced into China's arms."

"But you gave them a green light to use our nuclear materials in their space war."

"They already have been for days or weeks. So have the Americans. We haven't protested. If China is still using Martian plutonium and uranium for military purposes two years from now, we'll be in the position to do something about it."

Human left and Will turned back to his work. Moses Waigwa emailed that several scientific expeditions—including the folks at the North Pole Station, who had a portable nuke even though they were in perpetual sunlight—were dragging their feet getting back to an outpost. Will promised to video mail the expeditions if that would help. Henry Smith, who sounded agitated, asked for an appointment; he agreed to one that afternoon.

Madhu Gupta-Anderson emailed him asking whether unemployed workers could be paid by the government to work on art and beautification projects, and Will replied quickly that they should be so employed; it would be good for everyone's morale. Ramesh Pradhan emailed expressing grave concern about the lack of electricity for fabrication and construction; Will replied as assuringly as he could.

Will headed to Jacaranda's to review the press statement and talking points while someone came in to put makeup on his face to cover his tired look. Then they went to the media room for the press conference. Four journalists awaited, one more than usual; five members of the public attended as well. Will delivered his statement to them, then took questions from the local journalists while the terrestrial journalists's questions flew across interplanetary space; they arrived and he answered them, a repetitive task because of the asynchronous nature of the event. After ninety minutes he was finished.

The cabinet met over lunch. The main item of business was refining the rules of engagement for space "combat." Firing engines at an approaching ship had potentially fatal consequences; solar panels and antennas could be ripped off. The "attacking" ship could reciprocate, but would suffer the consequence of pushing themselves away from their target. Engineers had estimated the distance where an engine firing provided a frightening warning rather than fatal damage. They finalized the rules and drafted a public statement that they considered it a legal right to defend their space property.

Throughout the discussion Henry Smith was quiet. At the end of the meeting he apologized to Will that he needed another half an hour before they could meet. He returned at 2 p.m.

“I’m sorry for the delay,” he began. “I had to make a few more calls to businesses across Mars and to relatives in Utah.”

“What have you got?” asked Will.

“This is the sort of news no one likes to hear. Support for a neutral stance is not unanimous here on Mars. Among the business community there is pro-American sentiment. Some of it is American patriotism, among the Marsians of American background in particular, but also among businessmen who have always admired the U.S., such as the Nigerians. Some of it is anti-Chinese feeling; the Chinese are a great, indigestible lump on Earth, they will always be different and always difficult.”

“A description that partially fits the United States as well.”

Henry ignored the comparison. “And finally, some of it is a desire to avoid the economic disaster that the shut-down of the reactors will produce. People could go bankrupt. Businesses will be changed forever. And for what? I doubt the U.S. will demand a piece of Phobos any more. They’re trying to defend themselves, so some of their actions are justified. There’s no evidence they would have seized all our assets at L1 and not let us use them; seizing them might just be a way to insure they don’t fall in the hands of the Chinese. If there’s any country we can trust, it’s the United States; they’re a democracy with a stable government based on the rule of law. The course we are pursing hurts us far more than it hurts them.”

“Henry, I need your help to clarify the situation. I can understand patriotism; I’m American myself and I love America as well as Mars. But we have to keep our priorities straight; we are on Mars, not in the U.S., and this is our adopted country. I can also understand distrust of the Chinese; people often distrust those who are different,

especially when they are proud of their differences and uniqueness. That's why others distrust Americans. We need to look at the culture of both China and the U.S. very closely. The United States is a democracy with the rule of law, but in the last few decades the political polarization has become extreme and each side has often given a higher priority to obtaining and keeping power than to doing what is best for the country. It is premature to assess the motives of the current American administration, but it appears they have a goal of putting the Chinese in their place, a dangerous goal when dealing with the world's most populous nation, the second most powerful country on Earth, and one that has cultivated a powerful nationalism among its populace. The administration has put some naïve people in positions of great power and the decisions they made were not wise. Now they're using patriotism and the rhetoric of war to increase their power. It will work with the American populace for a while; Americans are furious about the nuclear attack on their soil and are willing to forget they launched the first nuclear attack on Chinese soil. But morally we cannot support such a military position. It would be wrong, and most Marsians know it. I think most businessmen do as well. I doubt we would have had use of any of our assets at L1. The U.S. was already playing hardball with us. These guys are followers of Victor Davis Hanson, the historian who argued for the use of the harshest possible means, especially when confronting evil; and they see evil in a lot of places."

"Will, I understand these arguments, but this stance is ruining business."

"And the American war on China isn't ruining business for your brothers and sisters in Utah? How are they doing?"

“They’re huddling in their basements waiting for the fallout to blow over. But that doesn’t mean we have to suffer as well.”

“Then assure the business community that we will take steps to protect them if the blackout continues. We’re working on unemployment insurance. We may be able to issue grants or interest-free loans to businesses that are failing. We have to look at this positively. Surrender isn’t a solution. They would demand we shut down the Chinese.”

“Have we any idea how long this will last?”

“Did you hear an estimate in the cabinet meeting? In a few weeks, maybe a month, we’ll have a better idea.”

“One danger is hoarding. I’ve already received two reports of apparent runs on stores for consumer goods.”

“If that happens we’ll take steps. What else?”

“That’s it. This won’t be easy and support isn’t unanimous, Will.”

“*Mars This Sol* says eighty percent of Marsians oppose the American moves; that means twenty percent disagree. But we are the government of one hundred percent of Mars. I need your help to keep everyone talking to us and to alert me when we can do something to help.”

Henry nodded. “And that I will do. Thanks for the time, Will.”

“Of course, any time.” Will rose and walked Henry to the door, then walked back to his desk. He felt more drained and pessimistic than he had felt all day. Internal opposition was the hardest to deal with. He’d have to talk to Henry almost every sol, to make sure he was working to help them, rather than against them.

7.

Confrontations

Early Nov. 2068

Ethel looked over the bare shelves at Deseret Walmart. The mouth wash was all gone; a sign said “sold out for a year.” The toothpaste section was similarly bare, as was the tampon section. In the last five sols people had spent a small fortune stocking up, in spite of Will’s urging that they not panic.

Sadly, she walked out of the dimly lit store and crossed the dingy Gallerie to Silvio’s El Corte Ingles. There she found a bottle of mouth wash, but for the exorbitant price of sixty redbacks. Reluctantly, she bought it.

She headed for Deseret Cafeteria to pick up soup and sandwiches for herself and Will, and walked to the Commonwealth Building. The six constables standing outside nodded to her as she entered; security on Mars was very familial. Will was waiting upstairs.

“Thanks, this looks good,” he said.

“I don’t want you not eating, and Huma’s too busy to get you something. How are you doing?”

“Fine. The crisis is settling into a routine, you might say.”

“They do that; for a while, anyway.”

“Exactly. What’s new at Uzboi?”

“I wish I could go see, but videophone calls and a peek at the live cameras in public places are the next best thing. Two jetwings left Uzboi for Cassini this morning

carrying a dozen people each, so the evacuation's underway, albeit reluctantly. It'll take a month to evacuate everyone who's leaving."

"If everyone's willing to leave; there's quite a crowd chanting and shouting outside the door to the reactor control room."

"I know, I took a look at the webcam several times. It's non-stop."

"Dawes and Cassini are scrambling to find places to accommodate everyone, especially the kids being added to their schools."

"Everyone's hoping the guys in the control room will surrender. But they took in a backpack of food. I talked to Rachel and she said she wouldn't cut off their water."

"She shut off the sewer connection last night and they began pouring waste water under the door, so the sewer connection was opened again. I guess we can be thankful the confrontation has been limited to shouting and pouring buckets of human waste."

"How much longer?"

Will shrugged. "Your guess is as good as mine. But let's not talk about it."

"Any possibility we could go for a walk in Baltic South this afternoon? It's lovely, green, and warm, perfect for a hike up a mountainside."

"I don't think so. God, I wish the two of us could get away!"

"Where?"

"How about. . . that nice resort south of Granada?"

She laughed. "Uzboi is not Granada!"

"No, and we can't go to our condo there now, anyway. Maybe we could get to the Dacha on Frisol night."

"Except it's hopping right now; people are spending money with abandon."

“I guess we’ll just have to stay home, my dear.” Will smiled.

“Sounds good to me. I’m feeling worn out, too. I have to lay off half my crew next month and figure out how to continue paying them.”

“By then we should have unemployment insurance service and we’ll have a series of public works projects to hire people for. It’s not exciting work, but it’s a stopgap.”

“Better than being on earth right now, with twenty percent unemployment or worse just about everywhere.”

“Exactly. Did you hear about the big riot in Guangzhou and the police crackdown? Made a mess of downtown.”

“I saw it on the news. It looked like parts of New York after the anti-draft riots.”

“I was pretty bad. They’ve lost control of Lhasa, and the troops are too busy making sure the US doesn’t invade to reconquer it.”

Ethel sighed. “The closest thing to Armageddon we’ll ever see.”

“I hope, because it could get much worse,” replied Will. “It’s not a question of nuclear weapons; it’s a question of anarchy.”

Sean Manning paused before knocking on Brian Stark’s door. He was tempted to put his ear against the door and listen first. He knocked.

“Who is it?”

“Sean.”

“Come in, Sean.” Brian was not enthusiastic to see his replacement. Manning opened the door and entered the former Ambassador’s comfortable living room. Brian

had been sitting at his desk in his office; he now stood in the door, as if he didn't want to enter his own living room and entertain his guest. "Unusual time for a visit."

"I've been busy all day; I was afraid you had gone to bed."

"No, I never go to bed before midnight. Of course, with no television, no web, and no email, there's not a lot to do."

"I've got a few ebooks, if you want to read one."

"Sure, depending on what you've got. What can I do for you, Sean."

"I just wanted to make sure you were comfortable."

"You mean, reasonably comfortable? I wouldn't be sitting here without communications, eating reheated frozen spaghetti for breakfast, lunch, and supper, if I were running things."

"Brian, let's not go over that again. The White House wanted action, not pressure."

"And action has worked so well! How are the guys at Uzboi and Meridiani holding out? They don't have a kitchen and a pantry full of frozen spaghetti."

"They've got more than you think; and we'd have more if you had stocked up!"

"I was gradually stocking up and that would have worked fine if we had cut back their power twenty percent here, then twenty percent at Meridiani, then thirty percent here, etc. More pressure; more uncertainty; harder for the Marsian government to stay on top of things; more public anger at the Commonwealth. You made it simple and stark."

"That's what the White House wanted."

"You mean the people who started a war with China, then dropped a nuclear bomb on them when things weren't going so well? You don't approve of that, do you?"

Manning hesitated. “You know I don’t. No one can. But we are servants of the government; Brian, we’re both *soldiers.* You don’t question your orders.”

“You can’t follow them blindly either; it’s against American law to follow an illegal order, Sean. The White House doesn’t know conditions here and it is our job to communicate that to them.”

“You tried, and you also reversed the power reduction at Uzboi. And you leaked the plans for the L1 attack, Brian.”

“You’re believing the White House, Sean. They’re speculating.”

“And if you just admitted it, they’d probably pardon you.”

“What?” Brian’s eyes flashed with anger. “You sound like an old Chinese communist interrogator, Sean! ‘Just confess and Big Brother will forgive.’ Have you ever heard of the Fifth Amendment? It is my right to remain silent, whether I did it or not; and I’m innocent until proven guilty.”

“That’s fine. You can say that at your trial back in the U.S.”

“If you can ever get me off this rock.”

“We’ll see. I think we’ll have to do something drastic to shake loose this stalemate.” Sean shrugged. “I’ll stop by tomorrow, Brian. Hate to have you get too lonely in here.” He turned, opened the door, and walked back out.

Brian watched him go with growing anger. Sean had been New Hanford’s chief of security; he was an efficient manager, but no diplomat and no leader. And now he was leading New Hanford is a very frightening direction.

Brian walked back into his office. He looked out the western window across New Hanford’s dome. The vegetable garden had been hastily enlarged along the length of “the

mall," the long formerly grassy strip running through the middle of their B-160 that had buildings set on both sides. It would give them nothing for several months. Beyond was a small orchard of citrus trees. Across the mall on its south side he could see the uranium enrichment facility and the plutonium extraction facility and outside the dome, the reactor. The mall was brightly lit because they had to run the reactor to make plutonium even if they couldn't sell the power. In the distance, beyond the western end of the enclosure, a half-full Phobos was rapidly rising above the horizon.

He went back to reading. A few newspapers did get through their weak connection to Earth, so he read them thoroughly; but he couldn't click on any of the video clips, much to his irritation. Finally, after an hour, he got ready to go to bed.

He was startled awake by a quiet knock on his door. "Brian! Brian!"

He recognized the whispered voice of his former chief of staff, Orlando Kivel. He ran to the door. "What is it, Lan?"

"Open the door." Brian could hear the tension in his voice. He opened the door. Orlando looked frightened. "Let's go."

"Where?"

"The garage."

That surprised Brian. Brian was in his pajamas and hesitated; Lan grabbed Brian's hand. It was urgent. Microphones were on and no doubt security would already know.

They began to run down the hall past the quarters of the other permanent members of the staff, then down the stairs. As they descended an emergency alarm went off. "All hands! There is an attack on the garage!"

“The secrecy’s over!” exclaimed Lan. They reached the bottom of the stairs and headed for the building’s front door just as a dozen half-dressed men began to pour from the cafeteria area a dozen meters down the hall. It had been converted into temporary housing.

Rather than use the building’s revolving door—which could also serve as an airlock if there was a pressure differential, but where they could get trapped—they smashed into the emergency exit’s opening bar, setting off its alarm as well, then ran like rabbits.

Fifty meters down the mall to the garage. They ran past the vegetable garden. The garage had men streaming into it, including two guards from the security center. One shouted “Stop!” but another man turned and decked him in the jaw; down he fell. A fistfight broke out with the second man and two other escapees, whom Brian recognized as nuclear physicists.

“How many are involved in this?”

“Fifteen.”

“Fifteen!”

Orlando nodded. They ran past the fistfight and into the garage. The men inside were pushing out past them to incapacitate the remaining guard. Then they dashed back in to bar the door against the onrushing crowd. The conestoga and one ranger had their airlock doors open and were ready to back into the airlock; the other ranger was already entering the garage’s other airlock with a pressure-suited figure hanging onto the back.

“Lan, this wasn’t part of the plan!” exclaimed Reggie Pearson, the chief nuclear scientist at New Hanford.

“Well, he’s here!”

“Okay, get in!”

They dashed into the conestoga. Pearson followed and closed the hatches behind them. It began to back into the airlock. Through the windows they could see the last three escapees jumping into the other rover. “Both rangers will fit into the other airlock,” advised Brian.

“That’s what they’re doing,” replied Orlando. “We’ve got guys in suits so they can open the outer doors mechanically if necessary.”

“You thought of everything.”

“We’re taking all the vehicles. They were planning to attack the solar power units.”

“The bastards.” Brian spat out the words.

The airlock’s front door opened; Brian was surprised how fast they depressurized it. The conestoga backed out, turned, and headed down the road to Aurorae. The driver floored the pedal and they raced toward the outpost at seventy kilometers per hour.

The ten men and women in the conestoga cheered as they began their escape. Reggie turned to June Addison, who was in charge of nuclear engineering. “We better call Aurorae and identify ourselves. I bet alarm bells are going off there right now.”

“I thought all communications were cut,” said Brian.

“911 still works.” Reggie pulled out his communicator and punched the number.

There was a pause. The face of a young man appeared on the communicator’s tiny screen. “Emergency.”

“This is Dr. Reginald Pearson. I have with me June Addison, Brian Stark, and a dozen others in a conestoga and two rovers. We have left New Hanford and are returning to Aurorae. We have taken all of New Hanford’s vehicles. Can you connect us to Kent Bytown, Will Elliott, or someone else in charge.”

There was a pause. Kent Bytown appeared in the field of view. “Reggie, what are you doing?”

“Kent, do you never sleep? Fifteen of us have escaped New Hanford and are requesting admission into Aurorae.”

“You got all their vehicles? How did you do that?”

“Not easily. Manning was suspicious. But he was laying plans to wreck as many of your solar power units as he could. It was a very controversial plan and a lot of us argued against it. They hadn’t set a time for the raid, but it seemed like a matter of sols, so fifteen of us decided we would act first.”

“We’re immensely grateful you acted to save life and property. This will sure boost our morale! But we have procedures. We have to board all vehicles coming from New Hanford to verify they are not a threat.”

“That’s fine with us! We’ll stop anywhere, though we’d rather not stop too close to New Hanford; the place gives us the willies.”

“I’ll send a ranger with six guys to meet you at the junction with Escarpment Highway; that’s half way. By then Will will be available to make decisions as well.”

“That’s fine with us! We’ve got pressure suits for everyone except Brian. We can all step out.”

“We’ll see, Reggie. Give us the names of the people on board.”

"Sure." Reggie began to rattle off the names, vehicle by vehicle. Brian turned to Orlando.

"So, this wasn't primarily a rescue."

Orlando shook his head. "A lot of guys were willing to leave, but they didn't want a complicated plan, and getting you out could have been complicated. Timing was everything; if I had been seconds later, or if you had been sound asleep, or if someone had happened into the hall at the wrong time, we would have had trouble. I decided to go get you, so I left my flat near yours a few seconds early."

"I'm glad you did. Sean was talking about shipping me back to Earth for trial."

"The White House wants you back. I doubt they'll be in power by then, though."

"I wonder whether there will be a New Hanford by then."

"They've destroyed a lot more than trust."

Will was awakened at 1 a.m. by an urgent call from Aurorae Control. By the time he got there, a ranger with six Emergency Corps personnel had reached the junction with the Escarpment Highway. A second ranger was waiting out of sight a half kilometer away. Just before the personnel prepared to board the vehicles to inspect them, the emergency operator turned to Will. "A call from Ambassador Manning."

"Can you put it through to the videophone over there?" The young man nodded, so Will walked into the conference room across the hall just as the videophone there began to beep.

A very angry face appeared on screen. “Mr. Chief Minister, we must have our vehicles returned to us as soon as possible with all personnel on board. They are all under suspicion of sabotage of our facilities.”

“Sabotage, Mr. Ambassador? What have you got to say to the claim that you were planning a raid on our solar power units?”

“That’s a lie. They’ve done extensive criminal damage to our uranium enrichment facility. It will take months to repair. We want all of them back so we can interrogate them and determine who was responsible.”

“We’ll interrogate them first and impound the vehicles. This is not to say we won’t return them to you, but we have procedures to follow. Of course, with no power coming from New Hanford, we have no formal relations with your government, so it’s not clear we would extradite alleged criminals.”

“Mr. Chief Minister, I wouldn’t push the United States too far. You already know what you have to do to get your power back.”

“I wouldn’t push us too far, Mr. Ambassador; I’m not stuck in an isolated facility without vehicles and with dwindling food supplies. I think we have nothing further to discuss, Mr. Manning. Good night.” Will pushed the button and closed the circuit. He walked back to the control room and turned to the screen showing Reggie. The image showed men with pressure suits walking around behind him; the Emergency Corps folks had entered the conestoga. “Reggie, this is Will Elliott. Ambassador Manning just called and said your people had done extensive damage to the uranium enrichment facility.”

Reggie shook his head. “We kept our plan simple; we headed straight to the garage from our quarters, except Orlando, who stopped to get Brian Stark. Anyone

vandalizing the uranium enrichment facility would have set off alarms and endangered the plan."

"That makes sense. Okay, when all of you arrive we'll have to debrief each of you separately. I doubt any of us will get any sleep for the rest of the night."

It was just before dawn when the debriefing—interrogation would be a more precise but less polite term—was complete and the sixteen escapees were released to their flats in Aurorae. Since the White House had already released the story that they had sabotaged a large amount of equipment before leaving, a bleary-eyed Will Elliott taped a statement that condemned plans to "endanger the lives of thousands of innocent children and adults" through destruction of their chief source of electricity. He referred to it as a "contemplated crime against humanity" and "potentially qualifying as genocide" and announced a press conference at 10 a.m. when four of the escapees would give statements and answer reporters' questions.

Then he went home for three hours of sleep. Shortly after he returned to his office a bit before noon he was startled by an emergency videophone call from Rachel Evans at Uzboi. "Will, the men inside the reactor control room are willing to surrender and have asked for terms."

"Terms?" Will considered. "Unconditional surrender and detention as prisoners of war until we determine their willingness to participate in Marsian civil society. No trials for crimes. We want the reactor undamaged so we can operate it ourselves. Do you have people who can run the reactor?"

“Yes, the reactor’s other shift. When Manning decided to shut the power off, rather than mixing his loyal people with the workers he was less sure of, he separated them and put only his loyal people in. The other staff feel guilty about what has been done and are willing to work for us.”

“Good, but screen them thoroughly; we can send the lie detector. Ask the folks who surrender to tape a message to the crew at Meridiani, pleading with them to surrender as well.”

“I can make that one of our conditions.”

“Yes, do it. How many people have been evacuated?”

“About one hundred. I hope this means they’ll be able to come back.”

“I hope so, too, but let’s not get ahead of ourselves. Let me know what happens.”

“Will do. Bye.”

“Bye.” Will closed the line, pleased. Perhaps the blackout would end soon. He sent the videotaped call to the Summarizer software to generate a transcript and email it to the Cabinet and key staffers. Yevgeny called back almost immediately.

“I’m relieved Uzboi will have its power back,” he said. “I’d press Meridani hard. The American shuttle’s closing in on our tanker farm and the climax will occur this evening when the caravel fires its engines at them. We’ve warned them twice.”

“Have they turned their ship to protect their solar panels?”

“Yes. We’ve delayed the firing until they are closer. We’ll issue a third and final warning this afternoon. So far there’s no evidence they have a laser on board.”

“Keep me apprised of any developments.”

“Of course. Bye.”

“Bye.”

Festus Rattigan scrutinized the television screen very closely. He could clearly see the faces of the four men who had come out of Uzboi’s reactor control room. His friend Horace, Director of the Uzboi reactor, appeared to be relaxed. The second in command, Felix, looked calm. None seemed to be under duress. Dirty dishes were visible on the side of the picture; they had just eaten a big meal. He contemplated the ham and cheese sandwich that the four of them in Meridiani’s reactor control room were splitting for supper.

Then the image faded; the recorded plea had ended. “Looks like this power blackout’s beginning to collapse,” he observed.

“Uzboi will be back on line in a matter of hours,” noted Hal Kretler, though his voice conveyed an ambiguous tone.

“It doesn’t affect us,” responded Kelly Simonetta, shrugging. He was in charge of the Meridiani reactor.

“Come on, Kelly!” responded Stefan Thibault, raising his voice. Like Festus, he had been opposed to the blackout. “New Hanford just suffered a revolt and lost all its wheeled vehicles.”

“Yeah, because they were going to start a war and destroy infrastructure!” Festus spat out the words. “The idiots. This has always been a planet at peace and now they want to bring Earth’s wars and economic collapse here.”

“The United States is in a war for survival!” retorted Kelly. “We’re here to do our duty for our country!”

“Easy for you to say; you just got here and have no sense of what’s being built here,” responded Stefan. “Festus and I have been here for over seven years.”

“So, are you Marsian or American?” replied Kelly. “Because you can’t be both. We’re under orders.”

“And look where they’ve gotten us,” growled Stefan.

“We don’t know whether the claim about the raid is true,” Hal reminded.

“Come on; you know Reggie and June. We’ve worked with them. They’re professional and honest.”

“They aren’t lying,” agreed Festus.

Kelly, who had spent only a month at New Hanford before coming to Meridiani, guffawed. “Traitors.”

“And the guys at Uzboi?” replied Stefan. “Horace and I built the reactor control rooms at New Hanford, Uzboi, and here. Festus and I were in Felix’s wedding party.”

“So?”

“You don’t think they were pressured?” asked Hal.

Festus shook his head. “No. Felix has a nervous tic; you saw it a little bit. If he was under stress it would have been a constant thing.”

“Interesting.”

Kelly looked at Hal. “Not really. It doesn’t matter what happened there, we’ve got a job to do.”

Festus pointed to their little refrigerator. “And we’ve got six more sandwiches in there; at the rate we’re going, that’s three sols of growling stomachs, then nothing to eat

at all. The tea bags are washed out; they don't color the hot water at all. The sugar's gone, the milk's gone, the fruit's gone. How do you propose we hold out much longer?"

"We could try giving them a little power for food," suggested Hal.

"Yeah, right," said Stefan. "All they have to do is say no another week."

"This isn't doing any good," said Festus. "We've been sleeping on the floor for six sols, washing a change of clothes and ourselves in the bathroom sink, and eating a half sandwich a sol each. The U.S. marines aren't going to drop from the sky. New Hanford's not going to show up because they don't have any vehicles. We could keep this up another month until we've nearly starved to death; but why?"

"We have our orders," replied Kelly.

"And if New Hanford wanted to give other orders, how would they?" asked Stefan. "Because they can't communicate with us."

"It's a bad situation," conceded Hal.

"That's one way of putting it," replied Festus. He looked at the door, locked to keep chanting protesters out. "I think we should open the door and surrender, just like Horace and his team at Uzboi. Let's be realistic."

"We could wait a few more sols and see what develops," suggested Hal.

"Why?" asked Stefan. "Festus is right; this action is a dead end. We can't leave, we can't get supplies, and we won't get rescued."

"The outpost could still capitulate," replied Kelly.

"Why? They have solar panels for basic functions," exclaimed Stefan. "You think stopping gold production for ten sols will produce a capitulation? They're madder than hell, and now they have a sense that the tide is turning."

"That's right," agreed Festus. He stood up. "Let's go, Stefan."

Stefan looked at him, then stood as well. Kelly leaped to his feet. "No!"

"You guys want to hold out, go ahead," replied Festus. "The six sandwiches will last twice as long, or you can eat two per sol instead of one." He walked toward the door.

Kelly raced ahead of him. "You traitor, you go sit down at your post!"

"Get out of my way!"

"No!"

Festus grabbed Kelly's left arm; Kelly turned and swung his right fist. Festus swore at him, grabbed the fist, and swung back.

"Hey, stop!" shouted Hal, but he didn't get up to intervene. Stefan, angered, hurried over and punched Kelly in the side. Kelly punched him in the face just as Festus punched him in the face. Kelly was not to be stopped easily; he came back with a swift kick in Festus's groin, causing Stefan to jump on Kelly's back and pound him from both sides. Festus, groaning, reached over and unbarred the door, then pushed it open. The six constables outside watched in astonishment as Stefan pounded at Kelly repeatedly, then Festus jumped Kelly as well and kicked him twice. At that point the constables intervened and grabbed all three of them to break up the fight.

Hal sat and watched the whole thing. He looked at the constables. "We surrender," he said indifferently.

The Marsian public was fascinated by the video of the fistfight at the door to Meridiani's reactor control room. It was running regularly on news channels that evening when the cabinet met to consider the new situation.

“Kent, we can’t assume passivity from New Hanford, even if they are deprived of vehicles,” cautioned Will. “It has thirty-four very clever, skilled, and determined men and women. They also have some heavy equipment on wheels that could be used against us. Sit down tomorrow with Reggie, June, and Brian and play a war game. Get them thinking about what equipment New Hanford has that could be used against us and brainstorm about counter measures.”

Kent nodded. “Okay. Should we include scenarios involving Deimos?”

Will nodded. “They’re still a ‘mixed’ staff; some no doubt are opposed to the blackout and are suffering from lack of contact with loved ones down here and are worrying about them. But they could mount a raid against our cryogenic facilities, solar panels, or microwave transmission rectenna.”

“They’re still participating in the electricity-sharing pool,” noted Yevgeny. The American, Marsian, and Chinese facilities on Deimos were about a third of the way around the satellite each and were connected with electrical cables to share power when each was in darkness. “They’ve been quiet and cooperative.”

“We can’t take a chance,” noted Kent. “I wish the forwarding of emails to family members down here would stop. I’d rather maximize pressure on them.”

“Forwarding messages is a bargaining chip to ensure peace,” replied Will.

“I think we shouldn’t be passive any more,” continued Kent, raising his voice. “New Hanford must be feeling pressure. We need to pressure them further.”

“How?” asked Indira.

“Let’s drive around their facility. We’ll be able to reconnoiter the place and it’ll worry them.”

“I want options, including seizure of the facility by force,” agreed Will. “I don’t think we should do that, but we may need to.”

“Do they really think they can hold out indefinitely?” asked Simin.

“They’re converting the lawns to gardens and have plenty of electricity and water,” replied Kent. “They’re going to be on half or even one third rations for a month or two before the radishes and lettuce kick in, and they may feel some nutritional limitations before grains and beans start to provide balanced amino acids to their diet. They’ll need two or three hundred square meters of garden per person, but New Hanford has plenty of enclosure. Farming will take half their staff.”

“What about broken equipment?” asked Simin.

“We don’t know how many spare parts they have, but they have some excellent mechanics,” replied Yevgeny. “And they have so much electricity and such a large enclosure that life support won’t be a limiting factor for years.”

“There’s one way we can destroy their agriculture,” noted Kent. He paused before he spoke. “We could modify the microwave rectenna on Phobos to beam microwaves at New Hanford. It would definitely destroy their farm; the microwaves penetrate a thin dome very well. But it would kill anyone outside and could damage the reactor’s electronic controls. So it is a last resort.”

“Very last resort,” agreed Will.

“It is not clear they can store enough food for the dust storm season,” noted Kent.

“That starts six months from now!” exclaimed Henry. “That’s a long time for us to hold out, and then *we’ll* have to deal with a huge drop in sunlight.”

“We have a plan, though,” replied Will.

"With Uzboi and Meridiani back on line, we will shift all solar power systems to Aurorae, beam power here from Phobos and Deimos, and truck in cryogenics. We can send construction workers to the other outposts to build cryogenic storage facilities and expand production of methane, oxygen, and silane. Elysium can host the entire Martech biology department; agriculture, geology, physics, and math can go to Cassini; the humanities can go to Dawes; some of engineering can move to Uzboi. Classes xan resume via the web. That'll reduce Aurorae's population. We could shift a thousand workers from here and reduce our base demand for power by a quarter and our industrial demand for power by a third."

"That's getting us into the range we can manage with our supply," said Henry.

"Exactly. It'll break up some families temporarily, though," observed Will.

"Can't be helped; we're in a war situation," commented Kent regretfully.

Just then Yevgeny's communicator and Will's attaché beeped simultaneously. They both looked at each other, then their devices; the coincidence probably meant an urgent message was coming from cis-lunar space. They both activated the message.

"Bad news," said Will. "The shuttle chasing our water tanker farm apparently opened fire with a laser on the tug's antenna. They damaged the antenna, but the on board computer switched to the low-gain antenna and Mikhail Shtokman, commander of Mars Cis-Lunar operations, ordered the tug's engines to fire."

"The shuttle should have gone after the engines instead," quipped Yevgeny, "Will, we can get the live video feed." Yevgeny began to push buttons on his communicator, and a moment later the wall screen began to glow. Then a grainy video image of the American shuttle appeared.

At first, it appeared that there was nothing to see. But then Yevgeny pointed. “They’ve lost one solar panel.”

“And the other one’s gyrating,” noted Will.

“So is their high-gain antenna,” added Simin, pointing at a vibrating dish on one side of the vehicle. A moment later it snapped free and shot backward out of sight. The exhaust plume of the tug’s engines was invisible and had spread out to form a wide cone of gas, but it was moving at sixteen thousand kilometers per hour relative to the American shuttle and was quite powerful.

Then as they watched the shuttle suddenly flashed, pieces expanded in every direction, and then they were gone. It was so sudden and complete a destruction several of them cried in surprise.

“What happened!” exclaimed Kent.

“It blew up!” replied Will, shocked.

“But it wasn’t supposed to do that!” protested Kent. “The exhaust was hitting the capsule end, not the fuel tanks!”

“It did something,” replied Yevgeny. “I wonder whether the plasma stream rubbing on the shuttle gave it an electrical charge.”

“We wouldn’t have figured for that,” said Emily.

8

Proposals

Early Dec. 2068

Marshall Elliott moved the electronic page with the article he was consulting a little closer to the e-paper he was composing on. He pushed a button to page through the article, page after page successively appearing on the electronic surface as he scanned it for the paragraph he sought; then he drew a box around the sought-after text with his electronic stylus and pushed a button on the stylus to grab it, then moved the stylus to the electronic paper on which his doctoral dissertation was slowly taking shape. He placed the stylus on the page and pushed a button. The paragraph reappeared in the new place, complete with a faint little loudspeaker icon indicating one could hear the author reading the text as well. The citation was automatically added to the bottom of the page in the style that the dissertation committee expected. Then he moved the stylus to the next blank line and began to handwrite his observation about the block quotation, each word being transformed from handwriting to Times Roman type as soon as he moved on to the next.

He preferred to hand write his dissertation. Others used a keyboard to transfer their thoughts to electronic paper and, ultimately, to the silicon heart of a computer; yet others worked best by dictating. So far the long voyage to Saturn had afforded a lot of time to write. Most of the members of the Saturn expedition were writing; every day a group was meeting somewhere to critique an evolving manuscript.

A “glass” elevator—it was an airtight plastic bubble—began to descend the court from the atrium above. Marshall spotted it near the top, some six floors stories above the court’s floor. He was on their balcony, sunning himself and enjoying the fresh air and

vegetation while working on his dissertation. The galleon's six courts were of great importance in making the ship pleasant and livable. Forty-five meters in diameter, the *Korolev* was divided into inner and outer parts. The inner fifteen meters around the hub was called the atrium; its big, circular floor was a place where everyone could assemble and see each other. The space was used for classrooms, meeting areas, eating, entertainment, and sometimes office space. Citrus trees scattered about the atrium yielded most of their oranges, lemons, grapefruit, and limes.

Extending outward from the atrium to the ship's spinning rim were six spiral shafts that were so large they were called courts. Five meters wide at top, they widened to ten meters on the bottom; their breadth was half the thickness of the ship, which was eleven meters at the ship's outer edge and sixteen at the atrium level.

Previous galleons, designed for transport of passengers between planets, had had simple courts with flat bottoms and vertical sides; standing on the floor, one could look all the way up to the hub area. But the *Korolev* and *Von Braun* were designed to function both in interplanetary space and on the surface of Titan, where the moon's 1/7 gee would pull everything at right angles to the centrifugal gravity that the ship's spin caused. As a result, the courts were designed to function in the absence of horizontal and vertical surfaces. The "bottom" of the court—which would be the bottom after landing on Titan as well—sloped distinctly; it was like walking on a hillside, and the lower side had a pool of water. After they landed on Titan the slope would be reversed and the pool would be against the opposite wall.

The "sides" of the court also sloped. Because the court spiraled, one side had an overhanging wall while the side opposite was a very "steep" slope. The side that would

be “down” relative to Titan’s gravity started out “flat” close to the hub and became “steeper” closer to the rim, where centrifugal gravity would be three times as great as Titan’s gravity after landing. The result was a space that was disorienting at first, until one adjusted to its strange orientation.

The courts were also the sites of intensive agriculture. Scattered lights illuminated the court almost as brightly as the Martian surface; it was hard to read electronic paper in the direct light. The brightness fed vegetables and other useful plants that covered almost every surface; even the walls of the court were covered by as much as a meter of plants, thanks to a network of hydroponic tubes, a mesh of renewable plastic fibers, and a living carpet of genetically modified fibrous algae about a centimeter thick that held the plants’ roots. As Marshall looked over court 5, a Spider 15A agribot climbed the opposite wall, picking ripe tomatoes and beans. The galleon’s six courts provided its 150 inhabitants with their only open spaces and nature; they generated half the ship’s oxygen and food; the floors were places for children to play and people to exercise and socialize; and the two-meter wide balconies, fringed by vegetables, provided personal space.

Marshall watched the glass elevator descend to the second level where he was located and stop. Amy got out and walked along the balconies to their flat. She walked to their flat and kissed him.

“You look comfortable.”

“Sunning myself and writing my dissertation.”

“I’ll join you in a moment; I’ve got to rewrite my chapter two.” She hurried inside their flat, a long thin space, three meters wide and twelve meters deep. The ceiling was not parallel to the floor; a wedge of storage space made the ceiling 2.16 meters high on

one side and 3 meters high on the other. After landing the wedge would be transferred to the floor to give it exactly the right tilt so that it would be flat under the combined gravitational forces of Titan and the ship's rotation. The front five meters was their living room, the next two meters had their bathroom and storage, and the last five meters was their bedroom. The latter was her destination. She grabbed her paperwork in a drawer and came back to the balcony.

"Can I have some of the electronic paper?" He liked to set up every article he could conceivably need on a different sheet.

"Sure." He deactivated three sheets and rearranged the little table so they were in front of her. She sat across the table from him and pulled up her dissertation on one of the sheets. "How was the class?" he asked.

"Pretty good. I'm learning more about the ecological characteristics of East African savanna grasses than I ever wanted to know."

"Especially considering we're four hundred million klicks from most of the species."

"Exactly! But we're almost done with them, and Gina promises that she'll cover the new low-light species they've started growing on Mars."

"Much more relevant. I'm not certain there's any point to learning about African savanna grasses on a flight to Saturn!"

"Some of them have interesting drought resistance characteristics. Who knows, we may import some of them; Mars has twenty species in the Serengeti Bioarchive." She paused and looked at him, to make sure he was paying attention. "By the way, I took my temperature. Tonight's the night."

“Oh, alright.” He smiled at the thought they’d try to make a baby again, though they were getting frustrated that, so far, they had been unsuccessful. “Maybe this time will be the right time.”

“I hope so. Did I tell you Liza’s pregnant?”

“No; when are they due?”

“Late May; six months.”

“A few months after we pass Jupiter; the first baby born in trans-jovian space.”

“Unless Soo and Guangya’s baby comes first. We’re going to reach Saturn with quite a crop of little ones.”

“Not many things to do on this long trip. Of course, the more babies we arrive with, the more complicated base-set up will be.”

“Yuri can stretch out the schedule. We still don’t know what we’ll accomplish in the Saturnian system.”

They turned to their respective theses. A half hour later Marshall hurried inside and changed into gym shorts and a tee shirt, then came back out.

“Got a game?”

He nodded. “The Eagles are set to win the 2068 *Korolev* zero-gee volleyball championship and then we’ll whip the winners on the *Von Braun.*”

“Dream on. I won’t be here at suppertime; I have finish programming a Spider 15A to pick corn.”

“I wish they’d let us do more picking!”

“Dear, I’ve told you a dozen times that if you want to pick vegetables and fruits, you can. You just have to deal with the procedures. Agribots can pick off dead leaves and

prune unwanted branches; they can spend ten times as much time with a plant as a human ever would want to."

"I know, and I know that helps productivity. Good luck with the programming."

"Thanks. And can you zip over to the *Von Braun* and pick up my dry cleaning?"

Marshall had always been amused by the idea that a flight from Mars to Saturn would have a dry cleaning service, but when the mission involved two thousand-tonne vehicles carrying 150 people each, it was not surprising. "Okay." He turned to leave, but just then his communicator beeped and a message icon appeared in the upper right corner of the electronic paper sheet nearest to him. Marshall tapped it with his stylus; the handwritten dissertation was replaced by an email. He read it and laughed.

Amy was startled. "What's so funny?"

"It's really not funny; more like sad, even idiotic."

"What?"

"An email from NASA to all American citizens on the Saturn mission. . . 'your nation needs your assistance to place your mission under the firm control of the National Aeronautics and Space Administration, the only agency capable of supporting your efforts in this time of uncertainty.'"

Amy laughed. "They want a mission run by a Russian, with a crew that's maybe twenty percent American, to abandon the certain support of Mars for the uncertain support of a nuke-wielding, politically and economically unstable nation that may be undergoing a social collapse?"

“That sounds right. They have no idea what’s going on here. This will be terrible for the *Eagles!* Too many people think of us as an American team already and they root against us!”

“Don’t worry about the *Eagles.* This is a crazy thing. I wonder if this is a NASA stunt to try to stop a major budget cut?”

“Could be.” Marshall clicked on “reply,” typed “Nuts” and hit send. He didn’t even add a period.

“That’s your reply?”

“Yes. They’re four hundred million klicks away and I’m a triple national; what can they do to me?” He leaned over and kissed her. “See you this evening.”

“Good luck!”

He nodded and set off along the balcony, from flat to flat—everyone used it as a private space, but it was also the only way to reach their front doors—to the end of the court, then crossed a bridge to the other side and waited for the elevator. It took him up to the Atrium, where he had to shift over to another elevator; six elevators went from the Atrium downward to the galleon’s outer edge, but only three went up to the hub. Walking to the other elevator he passed Commander Yuri Severin and his numbers two and three, Sridhar Prathan and Johnny Lind, from India and the U.S. respectively. They were laughing. When Yuri saw Marshall he called out “Hey Marshall, come over for a sec. Did you get that stupid NASA email?”

“Yes, I’m a triple national: U.K., Mars, and U.S.”

“The order you mentioned them is interesting. Say, if your father was commander of this mission, what would he say in reply?”

Marshall stopped walking to think. “Well. . . I suppose he’d say thank you, but no thank you. Not in those words, of course.”

“You need those words now, Yuri,” said Johnny. “No reason to tick them off.”

“You never know, they might actually send us support some day,” added Sridhar.

“With Canaveral nuked, Los Angles half evacuated because of San Diego’s bombing, the stock market shut down for six weeks, and the banking system hemorrhaging dollars? I doubt it. But I suppose I shouldn’t call them a bunch of cowboys and ‘good ol boys’ who deserve trial before an international court and execution for their so-called ‘Christian’ immoral behavior!” Yuri raised his voice progressively.

“I can ask India for support,” offered Sridhar.

“They may be better able to help than anyone else,” replied Johnny.

“Dad would probably say something like we appreciate your offer of support and are grateful for your continued commitment to the Saturn Commission treaty,” suggested Marshall.

Yuri pointed at him. “Yes, that’s your dad. He’d ignore the stupidity and remind people about their promises. That’s what I’ll do.”

“Any time,” replied Marshall. He turned and headed for the elevator; he was late for the big game.

The new Grand Mosque in Niger Dome was very impressive: a large space with Moorish columns supporting the ceiling and quranic quotations in golden Arabic calligraphy running around the upper parts of the walls, with complex geometric patterns adorning the lower walls. Unique in all of Islam, the mosque was round with a portable *mihrab*, the

niche normally built into the wall facing Mecca; but since Earth could be located in any direction, the building was round so the mihrab could be put anywhere. With the sun high in the north during that hemisphere's summer, that noon the gathering faced north.

Nearly all of Aurorae's 250 Muslims—Sunni and Shi'i—attended, the men praying on the right side, the women on the left, a low screen of richly embroidered cloth separating the two. Non-Muslims—some five hundred—sat on the carpets behind the Muslims and observed the obligatory prayer in silence. Following brief sermons in English by both a Sunni and a Shi'i—something the mosque rarely did—an interfaith service for peace was held, with Bishop Miller and Abbot Suzuki speaking of the yearning of peoples of faith for peace and justice. The outpost's Hindu priest read from the Bhagavad-Gita and Chief Minister Elliott spoke. Then everyone headed downstairs for refreshments; the Muslim community was excited to host their neighbors of faith.

"Who would have thought that we'd get almost twenty percent of the outpost on a Frisol afternoon," Will said to Prince Bilal as they sat at the head table with their plates of rice, shawarma, and falafel.

"We are very, very pleased," replied Prince Bilal. "The mosque's been open just a month. We wanted to do something big for our neighbors, but every idea was controversial for some segment of our community. The war has forced us to be united."

"Necessity is the mother of invention," agreed Will. "You're ready."

"There's plenty of food."

"Prince Bilal, how did you do the calligraphy and the mosaic floors?" asked Father Greg, who was seated across the table from the host.

“The calligraphy is just like the ‘frescos’ in your cathedral; wallpaper, essentially. But the mosaics are real. They took an incredible amount of time; that’s what delayed the opening of the mosque.”

“Must have been expensive,” commented Yoshi Suzuki.

Bilal nodded. “It’s work that could not have been done here five years ago, the resources didn’t exist.”

“We’ve been thinking of redoing the floor of the cathedral for that reason,” agreed Greg. “And the stucco work?”

“They’re plastic; a computerized gun built them up microscopic drop by drop. It’s a new technique developed in Morocco, and the stucco designs come from Moorish originals.”

“Will, how do you think the situation with New Hanford is going?” asked Yoshi.

“It’s been five weeks since Reggie and June brought out a third of the personnel at New Hanford, and our only information about them has been through the media. You’ve seen the reports on *Mars This Sol,* so you know as much as we do. They claim to be in good spirits and comfortable. But they should be getting thin and hungry by now.”

“Do you think the destruction of their shuttle has been a complicating factor?” pressed Greg.

“The U.S. was furious, but as we have noted a hundred times, when one is protecting assets that are under attack, people can get hurt. If we had simply let the assets fall into U.S. hands, there would have been grave implications not only for us but for the moon. We’d have no fuel for the upcoming columbiad; that would mean no immigration. And with ample fuel at L1, the U.S. would have been in the position to complete their

takeover of low earth orbit and to control all flights to and from the moon. Instead, neither goal was accomplished."

"With the destruction of most low Earth orbit facilities and the spreading economic collapse, there are no flights to the moon anyway," noted Bilal. "Platinum prices are falling and Parenago's cutting production."

"The Indian, French, and Brazilian spaceports are still open," noted Will. "Their prices are good because of the collapse of demand, though shortages have limited flights from Brazil. If conditions permit, we'll move as many of our people to the moon as possible. And a lot of people leaving Parenago are emailing us and asking whether they can go to Mars instead. There are 200 potential migrants already on the moon."

"Then we will have some immigration next year," concluded Bilal.

"We still have to get the personnel to the interplanetary vehicles and the vehicles to a fuel supply, and that may not be possible if the Americans move ships back to cislunar space. But right now they're pretty busy destroying Chinese satellites and battling Chinese crews in low earth orbit."

"Will, that raises another matter," said Greg. "The Chinese vehicle that lasered the American tug to destruction last week was powered by a solid core nuclear engine. I presume the uranium was Martian."

"It probably was, but we have no way to be sure. This is no time to protest a violation of the treaty. The Chinese reactors keep half of Mars going. We're building up our solar and wind sources as fast as possible, and then we'll be in a position to bargain."

“We must, Will. It tears my heart to think that every time I flip on an electric light, I’m justifying the splitting of atoms and the production of plutonium that could be used to kill human beings.”

“I know. I feel terrible about it as well. I was uncomfortable about relying on nuclear power, but it offered more reliability at a reasonable cost and it guaranteed that fuel for nuclear rockets and space reactors would be available without risking damage to Earth’s ecosystems. Without that fuel, no one would be on Callisto or on their way to Saturn.”

“So, will we own all reactors from now on?”

Will nodded. “We have to.”

“What do you think of Greg and I going to New Hanford?” asked Yoshi. “We would take messages from the men’s families and return with messages from them. It would be a humanitarian gesture. We might even be able to open some discussion that could resolve the standoff.”

“I’m not immediately opposed to the idea. We have to clarify the goals of the visit consult with the cabinet. Delivery of messages would be fine, I think. There may not be much to negotiate because Manning’s under orders from Washington.”

“Is Pete Theodoulos and Ruhullah Islami in touch with the Americans?” asked Bilal.

“Washington has severed diplomatic relations, so our communications are indirect, through the Australian Ambassador.”

“What are we demanding?” asked Greg.

“We will not punish anyone or expel them from Mars, but New Hanford must be our property and under our control. We will hire the workers who are there already if they prove cooperative and willing to be a part of Marsian society.”

“I didn’t think you had signed the confiscation bill,” observed Yoshi.

“I’ll sign it later this afternoon. This sol is the constitutionally mandated deadline; I have to sign it within a month of passage by the Mars Council.”

“What do you say to the objection that we should purchase what we are confiscating?” asked Greg.

“The damage they did to us exceeds the value of the assets we are confiscating.”

Greg nodded. He looked at Yoshi. “We’d like to go tomorrow.”

“The cabinet meets at 6 p.m. Why don’t you come and make the request?”

“Okay,” said Greg.

They turned to other matters; the state of the Marsian public, the terrible difficulties on Earth as economic collapse caused riots and martial law in city after city, the experiences of their relatives back home. Will left the gathering feeling gloomy. He headed back to his office, where he called in Huma and the other staff working on the third floor and signed the confiscation bill, making it law. There were no cameras present; no reason to make the occasion more offensive to America.

He turned to his messages and saw an urgent one from Helmut Langlais, Commander and First Minister of the Ceres settlement. It was hard to believe that the twenty-six year old kid who had arrived on Mars twenty years ago now had white hair.

“Good sol, Will,” he began. “I don’t know whether you heard, but the launch of our mining equipment and other essentials from the L1 Gateway has been postponed

indefinitely because of the disruption suffered by the facilities there. Interestingly enough, earlier today NASA emailed an offer of support—details not provided—if we agreed to become an American project. Needless to say, none of us were interested in the offer. I haven't replied to the NASA email; I'll let the Asteroid Belt Commission deal with it. But we feel obliged to take such an offer seriously.

"We love our work here. We've been on Ceres eighteen months; Central Outpost is set up and our greenhouses are thriving; two exploration teams are out almost continuously and we've reconnoitered ten percent of the asteroid's surface in detail. The deep drilling project, in spite of the gusher, has been a success; we're now ten kilometers down and in a few months we'll be able to resume work. Ten months ago our ataxite mining and refining equipment arrived from Earth and we've had it set up for six. It's been producing a tonne of platinum-group metals per month for export and we had planned to send nine tonnes to earth for sale early in 2069, though now we wonder whether we should wait. Everyone's happy, the kids are thriving, and we have two babies on the way. We were supposed to receive more crew; they were scheduled to fly to Mars next summer and head to Ceres in the fall. But that flight is probably impossible now.

"We're a permanent Ceres community. But all that is threatened by the situation on Earth. How much is Mars able to help us? The next launch window from Mars to Ceres opens in a bit less than a year. We're scheduled to receive cargo from Mars, much of it made there. The Commission's contacting Yevgeny, but I thought I'd add my personal plea that you do everything you can to support us. We're vulnerable out here. We can't continue without support. With Earth melting down we have to consider

whether to evacuate, and if we evacuate to Mars the launch window opens in a few months. So let's urgently dialogue about this. Bye."

Will watched Helmut's image fade and felt the man's pain. Even if the American-Chinese war was resolved soon, the economic damage would disrupt spaceflight budgets for a decade or more. But space was no longer empty: Mercury had 120, Venus orbit 25, the moon over 1,000, Mars 7,000, Ceres 60, the outer asteroid belt mission 30, Callisto 90, and the Saturn mission 300. Someone had to support all those people and facilities. It was doubtful Mars could handle it alone. Furthermore, the moon, Mercury, and Ceres only had gold or platinum-group metals as exports; buying them in exchange for Marsian goods would be like importing coals to Newcastle. Venus, Callisto, and the Saturn facilities had nothing to export at all.

He hit reply. "Good sol, Helmut. I feel your worry and share your pride of accomplishment. We want to help as many people as possible. Saturn gets our priority because of the distance, but Ceres is second. We'll do everything we can. Send us a list of things you need and we'll try to figure out whether we can provide them. The problem, of course, is that we don't know how we'll need to provide for ourselves; the future is very uncertain right now. Bye."

9

Decisions

mid Dec. 2068

Lal Shankaraman walked with a very steady pace down the corridor of the Commonwealth Building toward Will Elliott's office. He knocked on his door.

Will looked up from his reading. "Lal, good sol. Come in. I got your message."

"Good." Lal entered and headed toward Elliott's meeting table. The Chief Minister stopped at his hutch and poured two cups of tea, then walked over.

"Your timing's excellent, I needed a new cup full. You've got a nephew at UCLA, right?"

"He was at UCLA until the semester was canceled after San Diego was bombed. He finally got a flight back to India a few weeks ago. His mother was beside herself."

"I can't believe the campus was looted and torched."

"The anti-draft riots were incredible. For once, I felt some sympathy for President Knight. He doesn't have enough troops to hold the country together and fight a war."

"The U.S. and China haven't been actively fighting for six weeks, except in space; they're too busy pacifying their cities." Will shook his head. "My sister's retired and on social security. Her bank account is frozen and the other day the bank—second largest in the U.S.—declared bankruptcy and the FDIC announced it couldn't insure the accounts. Ethel and I had an account in that bank, too. And now her social security checks have stopped coming. A cold wave just hit New England and there's a shortage of heating oil. All the cities are under martial law because of the riots over shortages. Food's scarce, electricity's irregular. . . it's an impossible situation."

“I thought she was going to Bolivia?”

“She was, but the troubles there are pretty bad and without social security she can’t live there. It looks like a friend will drive down from Vermont with a wood stove and she’ll take in two or three families who are underemployed and can’t afford to keep their houses heated. My sister has a big house with an acre of trees. The men will cut the trees for the woodstove; that way no one has to buy heating oil.”

“It sounds pretty crowded. I suppose the guests are Bahá'ís?”

“Not all of them. Bahá'ís are pooling resources any way they can.”

“Just like churches, mosques, and temples. The situation in India’s better; there’s heat and light. But my cousin in London says unemployment there is thirty percent.”

“Yes, with martial law and shoot-to-kill orders.” Will shook his head. “Anyway, what can I do for you?”

“The Mars Council’s getting anxious. Two months without power from New Hanford. . . There must be some way we can end the stalemate.”

“I know. We’ve got the solar power units set up, but we’re still short, and dust storm season’s four months away. Father Greg and Yoshi visited New Hanford two weeks ago and reported that everyone’s pretty thin and tired. There’s no hope they’ll get reinforcements or supplies from Earth. So we’re waiting them out.”

“Neither the U.S. nor China have launch facilities, except the facilities the U.S. commandeered on San Salvador island.”

“Which the Chinese will probably bomb.”

“Waiting them out is a strategy with a political price, Will. People are getting tired of waiting. They want action. I hear it more and more among members of the Mars Council. Being nice to the Americans—letting them talk to family—didn’t help.”

“We weren’t being nice. One round was useful; it established that we were not vindictive, that we could wait them out, and everyone’s loved ones at least know the others are okay. We won’t authorize another round any time soon. Manning didn’t send us a message with Greg and Yoshi, and Pete and Ruhullah both hear in Washington that the White House wants Manning to stay the course. What do you want us to do? Risk destruction of the reactor?”

“Nothing like that. How about some sort of intimidation? What about the microwave transmitters on Phobos and Deimos?”

“They point very accurately when they lock onto a microwave beacon; without a beacon the beams are not accurate. We might fry people or essential equipment.”

“What if we demanded that they surrender or we’ll rupture New Hanford’s dome? They’d be stuck in their airtight buildings and they’d lose all their gardens.”

“It could precipitate another effort by the U.S. to capture our L1 assets. We have to maintain a relationship with the U.S. after this crisis is over.”

“We may be the only people who do. Even a show of strength—circling New Hanford in all our vehicles—would be something.”

Will looked at Lal closely. “Are you trying to stake out a position as an ‘action candidate’ or something?”

Lal hesitated. “Will, I’m responding to popular demand.”

"I never heard you say the demand for action was popular, Lal. I don't see evidence of it. People don't think I'm a wimp. Sometimes we act and sometimes we're patient. I asked for action plans weeks ago. You just mentioned three of them."

"Maybe it's time to implement one of them."

"Maybe it is and maybe it isn't. Thanks for your advice, Lal. I appreciate it that expressed your position. I really do. Don't hesitate to come back."

"You know me, Will. I'll tell you when I think you're right and I'll tell you when I think you're wrong."

"Good, I want that." Will rose and saw Lal to the door. It was a bit precipitous; Lal hadn't finished his tea. But he had made his point.

Will poured out the undrunk tea and sat and considered Lal's position. The man had political motives for his position. The Mars Council would vote for Chief Minister in fifteen months. It would be Will's second four-year term if they reelected him; his last term, he had privately decided. Lal Shakaraman, as Speaker of the Mars Council, was his logical successor, in either 2070 or 2074.

Do something. There were things they could do. He turned to his attaché. "Record this video message to Pete Theodoulos," he dictated. "Forward it with a transcript to the Cabinet, Huma, and Ruhullah." He paused to look into the attaché's camera. "Good sol, Pete. Sent a message to the United States Secretary of State. The American power blackout has done between two and three billion redbacks of damage to our economy. The New Hanford and Deimos facilities and the Uzboi and Meridiani reactors are worth that much when one includes the subsidies we gave them based on the treaty. Our economic relationship with the United States is now in deficit, our patience is running

out, and we are still in a state of war. If power is not restored to us in three days there will be no possibility for the United States to retain its reservations on Mars and Deimos."

Even the kids attended the town meeting. Charlie Langlais, now fifteen, tall, and blonde, sat in the front row attentively next to his father. Oskar, almost seven, sat in the back with Clara and was much less interested. The rest of the Ceres Council also sat in the front row: Adam Haddad, head of construction; Juliette Lafontaine, their physician; Sophie Chen, head of environmental management; and Jack Alberghini, local jokester.

Helmut rose. "Okay, folks, this is a serious life or death situation. We can spend two hours and run down the full list of what spares we have, how long they're expected to last, which ones we can clean and repair, etc., but I don't think anyone wants to do that. No one knows what will break and how badly, anyway.

"There are various bottom lines. Our three nuclear reactors have a ten-year design life, which means seven years more. The caravel propulsion systems are mothballed and should be good for seven to ten years. Life support can be run almost indefinitely if we have access to enough power, since Ceres has more water than all the earth's oceans combined. The bottleneck is buffer gas; our argon and nitrogen supplies are already low will run out if we have to purge our life support systems often. Surface vehicles, space suits, and shuttles will be good for several years.

"All of these things will become hard to maintain if we don't get vital replacement parts; we can go three years fine, five years with difficulty. The issue is comfort and effectiveness. Imported consumer goods from Mars may be hard to get. Lack of tooth paste, shampoo, tampons, new clothes, and such are not trivial; some have health

implications and they all have morale implications. Maintaining our scientific equipment is a more serious concern; we don't want to be stuck here unable to do science. The deep drilling project is particularly vulnerable to breakdowns."

"Helmut, what supply commitment have we gotten from Mars?" asked Adam.

"Nothing specific. Last week they started planning for the possibility that Mars will get limited cargo this columbiad and none at all for several columbiads."

Adam frowned. "If it's a matter of life and death, you'd think they could make some sort of commitment! They can ship us ten tonnes of nitrogen and ten tonnes of consumer goods and minor spare parts. That's all we need to be comfortable and productive for three years. We can coast on our existing spare parts."

"And things we can make," agreed Jack.

"We're being optimistic," commented Ken Leonard, one of their pilots. "A very complex mechanism is keeping us alive. You're talking about a situation where the chances of a serious problem rise from maybe one in ten thousand to one in a few hundred. That's not something to ignore."

"True, Ken, but the odds are hard to assess usefully," replied Helmut. "You really can't create a model that will measure everything and spit out odds for every eventuality and whether we have a spare something or not."

"It's illustrative, though," replied Ken. "If we decide to close down here and fly back to Mars or Earth, the really dangerous time is the flight back, because we won't have millions of tonnes of asteroid resources backing us up."

"If everything had remained normal, how many flights were we scheduled to conduct in the next two years?" asked Rahula Peres.

“Two cargo flights to Earth with platinum group metals,” replied Helmut. “And four crewed flights of thirty to one hundred sols each to nearby asteroids as they passed by. The first crewed flight is scheduled for liftoff in two months.”

“If we canceled the crewed flights to nearby asteroids and postponed the platinum cargo flights, we’d have a simpler, safer plan,” commented Ken.

“The platinum won’t sell for much anyway,” agreed Helmut. “Prices have plunged. It goes without saying that we won’t be launching trips to nearby asteroids.”

“My thoughts about the situation are relatively simple,” said Lin Chen, a robotics expert. “We’re safe here now and we can keep life support going for years, so we stay until we can get relief or spare parts necessary for the flight are available.”

“The biggest potential danger is losing artificial gravity; our health would suffer pretty seriously in 0.04 gee,” observed Juliette. “But we have two caravels. If we lost spin in one, we’d head for Earth or Mars as soon as possible.”

“Artificial gravity will be fine unless the caravel suffers major damage from some sort of explosion,” replied Adam.

“Then why should we leave?” continued Lin. “We’ll be safe here for at least five years, maybe ten. Maybe propulsion won’t be working reliability by then, or life support won’t be closed enough to take the caravels to Mars. But no one thinks Mars couldn’t send us spare parts or a rescue caravel. The crisis on Earth isn’t *that* serious.”

“It might be,” replied Helmut. “Everything has started to shrink, so everyone is protecting their national industries, which breaks up the global economy into less efficient national units, causing more shrinkage and more protection. Add war, riots, and looting. No one knows where it will end.”

“It is bad,” agreed Lin. “If we have to leave we should go to Mars; they can’t evacuate and they’ll manage. But let’s stay. There’s a launch window in three years and we can evacuate then using at least some of our existing equipment. What’s the hurry?”

There was silence as everyone looked at each other. “I agree,” said Adam. “The deep drilling project is ready to move forward again. In three years we should get down fifty kilometers; ten percent of the way to Ceres’ center. We’ll have explored half the surface, which is probably all that’s worth seeing. And it’s our nominal mission.”

Helmut looked at Ken, who nodded. “The caravels should be good for four years.”

Helmut looked around. One by one, people nodded, some reluctantly. “Okay,” he concluded. “We stay.”

Will greeted sunrise in the Bahá'í House of Worship. His scriptures said it was the best time of the day to pray; a special time of dedication. He said a half dozen Bahá'í prayers silently to himself, by heart, then recited a dozen selections from Bahá'u'lláh’s *Hidden Words*; the short spiritual and ethical aphorisms seemed to give him an orientation. Then he pulled out his prayer beads and used them to recite.

He had a premonition that it would be a rough day. Or maybe it felt like a rough day because he had slept badly the previous night. Ethel was at Uzboi trying to get platinum production restored—a long and difficult process, once it was shut off—and he missed her advice and encouragement. He’d have to call her after breakfast.

He stepped out of the temple just as two other Bahá'ís arrived for dawn prayers. He nodded to them silently, grateful for the privacy, and circled the gardens a few times

to enjoy their beauty and serenity. The flower gardens had been designed to benefit butterflies in particular, and there were a lot of them at work that morning. There were also a few rabbits hopping around; the herd had to be culled several times per year or the flowers would all be eaten. But they added a sense of naturalness to the artificial nature that prevailed almost everywhere on Mars.

He took the tunnel to Andalus Enclosure, but rather than heading for the Gallerie he ambled across the square, then turned east and walked through a series of domes to Cochabamba, then back. He paused when he returned to Andalus to watch the kids enter the elementary school in the basement of the Borough Building. It was a swelling army of children; 140 first graders alone. A thousand kids aged two through five went to twenty preschool facilities scattered around Aurorae. He sat and watched the kids, wearing tidy uniforms and carrying their attachés, walking in. What Mars would they inherit in two decades? Would it be at peace or torn by troubles? Would it be utterly impoverished and self sufficient? Would its inhabitants be confined to the surface, or would they be a hub of interplanetary transport? And what would they think of Earth; would it be a partner or a distant place of chaos, war, and injustice?

The responsibility weighed heavily on his shoulders. The prayer probably made him more sensitive to the dangers and his role as a fulcrum that could tilt Mars toward a future, good or ill. Rather than dwell on the situation, he turned and walked briskly to the Gallerie, bought a yoghurt and a pastry, and headed for his office. Better to work than to contemplate.

He hung his medora on its hook, sat, and read overnight reports. Then it was time to go to the situation room, which they had hastily created in the building's basement last

month. He met there with Kent Bytown and Yevgeny Lescov several mornings a week to discuss the situation from a military point of view. Yevgeny was coming down the stairs from the ground floor at the same time and Kent was already there. He had a bed in his office, which had its own door into the situation room.

They sat at the table and refilled their cups with the strong marabica coffee that the situation room thrived on. “Let me start,” said Yevgeny. “There’s an interesting development in low earth orbit. Three hours ago the Chinese launched an intercontinental ballistic missile at the Earthshine Marriott. The U.S. has not issued a statement about damage, but the Chinese say the warhead detonated seventy-five meters from the station. They claimed the solar panels were torn off and the station punctured in dozens of places. The BBC reported that a European telescope on the Canary Islands photographed the station half an orbit later and that it was tumbling slowly with several pieces of debris drifting away from it.”

“Sounds like serious damage,” said Will. “They’ll probably have to evacuate, just like they evacuated Pax and JIRPS. That leaves the U.S. without an orbital facility.”

“Three down, none to go,” agreed Yevgeny. “With the second Chinese station smashed and evacuated as well, the orbital war enters a missile-powered robotic phase.”

“They won’t go after the Ibis Orbital?” asked Kent.

Yevgeny shook his head. “The Ibis corporate headquarters got a small contingent of French marines on board two months ago, so its neutrality is guaranteed. Besides, everyone wants a neutral safe haven where their shuttles can go in an emergency.”

“There are no more armed shuttles in orbit and no assets to protect, so the Ibis is a potential target,” said Kent.

“There’s still one armed shuttle in space; the American shuttle at L1,” noted Will. “I suspect it’ll return to Earth now, probably via the Ibis. After that, who knows? Let’s hope Ibis is spared and it doesn’t collide with any debris. We’ll need it if we hope to receive migrants next year.”

“I think we’ll be able to reconstitute our L1 facilities soon,” said Yevgeny. “Though we may want to choose another location, like high lunar orbit.”

“What’s left of the American and Chinese GPS and communications satellite networks?” asked Kent.

Yevgeny shook his head. “Not much. Everyone’s using the European GPS signals in low resolution mode if their equipment can receive them. Otherwise they’re having problems, like that American corn farmer who forgot his harvester had no access to GPS and accidentally let it drive itself into the river.”

“Any speculation about resumption of moon flights?” asked Will.

“No,” said Yevgeny. “The Ibis has no fuel storage depot and the remnants of Pax and JIRPS are inoperable. It’ll be some time before anyone can reconstitute a low earth orbit transfer station.”

“Under neutral control, like the Grand Union,” said Will. “I’m sure Pete will be talking to people about it.”

“The bigger issue is how long the existing shuttles can fly without the spare parts manufactured in San Diego and Denver,” noted Yevgeny.

“We’ve asked Pete for an estimate of the inventory of spares,” said Will.

“I’ve got one other matter,” said Yevgeny. “Last night Helmut Langlais emailed. They’re staying on Ceres. They’re asking for three years of basic consumables like nitrogen, argon, a few toys for the kids, and some spare parts we can make.”

“Accommodate them as well as you can,” said Will. “Saturn has a higher priority, but they don’t need anything quite as fast. Has Mercury had their meeting yet?”

“No, it’s scheduled for December 26. Two caravels could evacuate all of them, but I suspect they’ll stay,” replied Yevgeny.

“I’m surprised Venus Orbit station’s staying,” said Kent.

“They don’t have much choice,” replied Will. The return opportunity occurred before the war started and the flight that just arrived provisioned them fully for nineteen months. At that point they can evacuate to Earth or to here. Saturn starts its discussions in a few weeks; they’re in no hurry. Callisto’s managed to keep the peace, thanks to the two commanders, and is staying for now.”

Yevgeny shook his head. “But they’re all counting on us for resupply and possibly rescue, and we can’t promise anything past 2069.”

“No one can,” replied Will. “But Andries is putting together a plan. They need to know where they stand with us. We have to support them as best we can; it’ll determine whether Mars is the center of solar system exploration in the future.”

“I have a report too,” said Kent, who had been patient. “The first troop of rangers is ready to start practicing outside this afternoon. They’re going to conduct a bayonetting exercise and practice hand-to-hand combat in pressure suits. We’ll use a space between domes where no one can see us, but perhaps we should practice in full view of the public and make sure *Mars This Sol* captures some video.”

Will shook his head. “Father Greg and Yoshi and their peace-nicks would be furious while Lal and the other hard liners would be delighted. I wonder whether we can target the audience more effectively and rehearse near New Hanford?”

“Only if we have some cover. For all we know, they may have developed some explosives. We wouldn’t want a troop of soldiers armed with pointed metal spears scattered by home-made grenades.”

“Do we have a good feel for the effectiveness of these spears?” asked Yevgeny.

Kent nodded. “Yes; we’ve got two men nursing broken bones. They definitely can puncture pressure suits. Used as batons, they can beat someone up pretty seriously. It’s possible to smash a pressure helmet. The spears are most effective in one-on-one situations; we’d blow the dome, enter it, then blow a hole in a building and enter it, etc., storming facilities after we depressurize them. There’s no question we can take New Hanford, but at the cost of destroying it.”

“And no question we can ward off an assault on our facilities; any media coverage must stress the defensive importance of creating and training this troop,” said Will.

“It will be controversial,” noted Kent. “We have a strong peace movement.”

“One we have to protect from violence, too,” agreed Will. “Are we done?”

“I think so,” said Yevgeny.

“Good. Thank you gentlemen,” said Will. He rose and collected his tea cup and attaché. “So, Kent, we now have 150 soldiers trained to kill?”

“I wouldn’t go that far. The training has just started.”

“Even if we have peace, we need to continue training them. Switzerland has a very strong army and has never fought a war. We may need to follow their example.”

“I think so,” agreed Kent. “Isolation from Earth is no guarantee. We’ll need to plan a defense carefully.”

“Put some time into it,” agreed Will. He headed out the door started up the stairs. Just then a woman dashed out of the situation room. “Sean Manning is calling for you!”

“Oh? Thank you.” Will returned to the situation room. Kent moved a videophone onto the table; he and Yevgeny sat out of sight.

Will sat in front of the videophone just as it began to beep. He pushed the activate button. Sean Manning appeared on screen dressed in his nicest uniform. “Good morning, Mr. Ambassador.”

“Good morning, Mr. Chief Minister.” He paused. “The news of the destruction of the Marriott Earthshine weighs heavily on us this sol, especially as it follows the destruction of America’s six spaceports. It is now clear that the United States will not be in the position to send relief supplies to New Hanford in fifteen months; it is looking increasingly unlikely the U.S. will send supplies in two columbiads. We are therefore dependent on your good will for our survival.”

“Mr. Ambassador, we have been trying to tell you that for months and have responded to your aggressions with passive defense. A passive response has been growing less and less adequate. Uzboi and Meridiani will not recover from the infrastructure damage done by the blackout for some months. Aurorae is producing two thirds of its usual economic output and is experiencing extreme duress. The damage done to the interplanetary transport infrastructure will take years to repair. The damage to our economy exceeds the value of your facilities.”

“Mr. Chief Minister, the subsidies can be figured various ways. The United States was giving the Mars Commission a subsidy and you were essentially giving it back. It did not really come out of Mars’s pocket—”

“Mr. Ambassador, this is not the time to quibble about accounting. I assume that is not why you called.”

“No, it is not. I have called to negotiate circumstances under which we can resume the sale of power to Aurorae.”

“Excellent. At this point we will accept nothing less than jurisdiction over all your facilities on Mars and Deimos. They will be Marsian facilities from now on.”

“That’s not acceptable.”

“Then you can wait for resupply. Mars will never depend on another sovereignty for electric power again.”

“Sir, with all due respect, the course you are pursuing will guarantee that the United States will never subsidize Mars again for anything.”

“Mr. Ambassador, if the United States can’t send you supplies for forty-one months, it won’t be subsidizing Mars either.”

Manning grew impatient. “Sir, you are humiliating the United States of America.”

“We have no desire to humiliate anyone. We will accept your complete and unconditional surrender in a dignified and peaceful ceremony.”

Manning shifted uncomfortably in his chair. “Will you send the international atomic energy inspectors to New Hanford?”

“We will accept the terms of inspection by the IAEA fully. We were a driving force behind the wording and are completely aware of the requirements. We have no desire to use nuclear power for anything but peaceful purposes.”

Manning stared at him. “What of myself and my crew here and on Deimos?”

“Those willing to swear an oath of loyalty to the government of Mars will be free to remain here, but as the owner and employer at New Hanford and Deimos we will reserve the right to decide who will be in charge and who will do what job.”

“In other words, we might find ourselves repairing spacesuits and rangers at the North Pole Station?”

“If you mean we will exile people to remote places, that is not correct. We won’t force anyone to leave Aurorae unless they give cause. We’ll probably let most keep their New Hanford jobs, though we’ll bring in a lot of other folks we’re sure of. We’ll need some unusual team-building exercises to overcome lingering distrust and anger. But I don’t want to force people off of Mars; they’re smart and talented professionals whom we may need in the years ahead. We want everyone to stay and contribute.”

“Okay, I understand.” Manning hesitated. “Then we surrender unconditionally. When shall we do the transfer of authority?”

“Three p.m. this afternoon. I’ll come out with a force of constables. We’ll send out the IAEA inspectors in the next two hours. You’ll need to call Deimos and arrange for its surrender.”

Manning nodded. “Alright.”

10.

Thanksgiving

19 Dec. 2068 and later

All of Mars and much of Earth watched the ceremony that afternoon as the flag of the United States of America was lowered over New Hanford and the red standard of Mars—with its two yellow circles for the moons, its two white semicircles for the Martian poles, and its circle of twelve green stars for its outposts—was raised. A few minutes later a similar ceremony was carried out on Deimos. Will delivered a conciliatory speech about peace returning to the Red Planet and how they yearned to see it on Earth as well. Within an hour all thirty Americans that had held out at New Hanford were transported to Aurorae for a checkup, a good meal—they were very thin—and a rest, followed by debriefing over the next few sols. June Addison was appointed Director of New Hanford and a team loyal to Mars, including much of the university's nuclear science department, took over. Electricity begun to flow again.

Congratulations poured in from everywhere except the United States, which condemned the loss of its facilities. In Aurorae, no one worked that sol; it was as if a siege on Mars's capital had been lifted. Will declared the next sol "Thanksgiving." That night electric lights glowed brightly for the first time.

Andalus Square thronged with people. Marsians loved to socialize and on special occasion they wanted to be in a crowd. Two bands set up at opposite sides of the square for free concerts and played dance music. The Gallerie's crowd overflowed and the cafés along the sides of the square were packed. Ethel flew back from Uzboi and she and Will strolled the square visiting people. At one café Will ran into Pedro Flores-Lopez again.

He was wearing the uniform of the Marsian Rangers and sitting with fellow soldiers drinking beers. He had his right hand casually in the hand of a uniformed African woman, who had a sad look on her face.

“Pedro, I didn’t know you had signed up for the Rangers! Thank you for your service!” said Will as he walked by.

“Thank you for your leadership! Let me introduce you to my buddies.” And Pedro went around the table and introduced four men and a woman, all young like himself, from the Czech Republic, Korea, Liberia, Tonga, and Afghanistan.

“How’s the crowd reacting to your uniforms?”

“Ambivalently,” replied Muhsin, the Afghan. “Some avoid us; others smile; a few nod or shake our hands.”

“It’s a tough crowd; people want peace, but right now we have to guard it,” said Will. “The Rangers aren’t going away. They’re the core of the Emergency Corps. We want you to train a weekend a month and one month a year, just like military reserve units on Earth.”

“Are we going to get guns?” asked Tongsun, the Korean.

“No, but we’ll import tazers and stun grenades and refine the clubs you’ve got. We’ll design equipment we can make quickly in an emergency as well, such as armor for rangers and explosives.”

“We’ll serve any way we can,” said Miranda, the Liberian, who was holding Pedro’s hand. “We don’t have a lot of housing construction right now.”

“You’ll be busy, don’t worry,” said Will. “The work of converting solar panels into solar power units will continue and surplus power will go into cryogenic storage tanks. We’re not taking any chances.”

“Especially where the Chinese control the reactors,” noted Pedro.

“No, everywhere. We’ll pump methane and oxygen underground as well; the spaceport reservation has plenty of room for gas storage in the various aquifers several klicks underground.”

“Do you think we’ll lose contact with earth?” asked Miranda worriedly.

Will shook his head. “So far, this collapse doesn’t look that deep. Are you worried about your family?”

She nodded. “My father; he’s all alone now.” Pedro clutched her hand even more tightly. He turned to Will.

“Her mom was in San Diego; her brother was in Dalien. They’re both missing.”

Will nodded sadly. “I’m very, very sorry. A quarter of a million Americans fled to Tijuana and two million more are now scattered all over the country. The situation in China is similar. They may yet appear.”

“I hope so,” said Miranda.

“Do you think we’ll get any supplies this columbiad?” asked Vaclav, the Czech.

“Not many; we’ve lost three months when we should have been moving cargo to orbit. But the silver lining is that we’re learning how to do more things ourselves. This crisis can only make us stronger.”

“I suppose that’s true,” agreed Vaclav. “We’ve been designing a carbon dioxide scrubber at the Martech engineering department, where I’m a grad student.”

“We may develop the ability to build rocket engines,” said Will. “It isn’t beyond our capabilities, but until now it was cheaper and safer to import engines.”

“It’s a funny idea to call this Thanksgiving, then,” commented Miranda.

“We’ll focus on what we have, not what we could have,” replied Will. “That’s always the way it is with Thanksgiving. This is a hard year for a Thanksgiving, but it makes it more important than ever to remember what we have.”

“This is the right time to remember; we got our power back!” quipped Vaclav.

“Exactly.” Will waved. “Good to meet all of you.” He turned and headed across the square with Ethel.

“Bright young people,” Ethel remarked. “Did you see Pedro and Miranda were holding hands? We’re getting some very promising intercultural relationships.”

“We might banish a large portion of the Earth’s racism,” replied Will. He sighed. “I wonder whether Brian and Jen can visit Miranda to offer support.”

“I think it was perfect to declare this sol Thanksgiving,” said Ethel. “The alternative approach would be to declare it ‘Victory over America’ Sol.”

“No, let’s accentuate positive values.”

They continued down the square past the shuttered American embassy—still covered with red paint from all the demonstrations in front of it—and past the Chinese embassy, which had been cleaned a month earlier. Next to it was a Chinese restaurant and sitting together at a table was Father Greg Harris, his wife Anna Racan, Roger Anderson, and Madhu Gupta-Anderson. They all smiled at Will and Ethel. “Good evening!” exclaimed Greg.

“Good evening!” replied Will. “A great celebration, too.”

“You’ve got to declare December 19 a permanent Marsian holiday, Will,” said Roger. “This two-month conflict was a bigger struggle than independence. It has shaped our consciousness.”

“The Mars Council should pass legislation permanently making this sol Thanksgiving.”

“Good idea!” agreed Greg. “We should emphasize helping the needy.”

“We’ll add it to the holiday; I’m sure the content will evolve. I heard your commentary on American National Public Radio this afternoon. I was very impressed.”

Greg smiled in embarrassment. “Thanks. I wanted to say what America has always meant to us up here, and what it should still mean for us in spite of this conflict. I hope it’ll help Americans think about what America should be doing right now.”

“I’ll be on the Wolf network in two sols,” said Roger. “I plan to say things similar to Greg. I may even say the current President should be put on trial. I think that’s the only thing the U.S. can do to salvage its reputation.”

“An international trial,” added Madhu. “Because even though an American trial can be fair and can convict, it would be a sign of humility to allow an international mechanism operate.”

“That would be remarkable,” said Will. “What is the America-first network saying, Roger?”

“They’re demanding that he not be inaugurated next month. He’s painted himself into a corner. If he negotiates a peace with the Chinese he’ll almost certainly have to concede too much, and if he doesn’t negotiate a peace he’ll be stuck in a war without an exit strategy.”

“He seems to be trying the latter right now,” said Will. “Negotiations will be too painful.”

“Well, he started a stupid war without justification,” replied Roger. “And in the process he has done more damage to America’s reputation than anyone thought possible. He could try a complete admission of error with the American people. That’s the only thing that can save him from impeachment, assuming he doesn’t resign.”

“Keep up the good work, gentlemen,” said Will. “I’m drafting a speech about peace on Earth for delivery next week. Those of us who have become known on Earth have an obligation to shape public opinion as best we can.”

“And we need to do more healing up here,” said Greg. “There’s a lot of anger at America and China. It spills over against Americans and Chinese. Everyone’s worrying about relatives; Mariner Hospital’s mental health center is overflowing. There’s a lot of anxiety about our future. Then there’s the disruption caused by terminated or redefined jobs, family members moving to other outposts, etc.”

“I agree. Let’s make a plan; talk to Simin, she can probably assign some staff to the idea. The Mars Council is tense as well. We need a one-sol retreat together at the Dacha where we can rebuild trust.”

“That’s the disadvantage of a legislative body without political parties,” complained Roger. “No discipline. Every representative for his or herself.”

“We’ve done alright,” replied Will. “The Council needs to create an atmosphere of mutual trust and respect and we need to keep to the goal of serving Mars rather than serving our own careers. Retreats help a lot.”

“It’s like a marriage,” agreed Greg. “You wonder how long the peace can last and whether it’ll break down, and every sol you work on keeping the peace.”

Will chuckled. “Yes, and I think we can avoid a divorce. Ciao.” He and Ethel waved and headed across the square.

“They’re right; this society has been through a wrenching experience,” said Ethel. “We’ve lost our innocence. If the Commonwealth had imported firearms now instead of a year ago, it wouldn’t have been controversial.”

“That occurred to me,” agreed Will. “It’ll be a while before we realize exactly how the conflict has influenced us. Father Tuesday told me his church has had a huge influx of whites and Asians; only half his congregation is Nigerian. And there’s the new Unitarian congregation here in Aurorae, and a Unity Church of Peace.”

“And more are coming to Bahá'í meetings; we’ve had six new Bahá'ís in two months.”

“On Earth a lot of people are getting religion, too, it isn’t just the Bahá'ís who are growing; there’s the fundamentalist ‘Church of the Return’ that predicts Jesus’s descent on the clouds next year.” Will pointed to a nearby pressure tunnel. “Let’s walk around.”

“Okay.”

They headed through the tunnel and into Cathay enclosure. It was quiet, since most people were celebrating in Andalus, though one café was open and had a few people. They passed into Punjab and wandered down its main street past buildings with distinctively Indian architecture. The enclosure’s small square had Mars’s Hindu temple and a restaurant, Taj Mahal, which had a small crowd, mostly Indians. They spotted Sarah Pannakar feeding her three children and waved. “How are you?” asked Ethel.

“Quite well. How’s the celebration?”

“Boisterous. There’s music.”

“I may visit with the kids. I was at the hospital late and just got off work.”

“How’s your new place?” asked Will.

Sarah nodded. “Pretty good. Our flat’s over there.” She pointed to a four-story building up Gandhi street. “We’re settled in and comfortable. It’s better than the place that burned.”

“Good,” said Ethel.

“I don’t know if you heard.” Sarah lowered her voice a bit. “The court date was two sols ago. The divorce is now final.”

“Good; thanks for telling us,” said Ethel.

Sarah nodded and glanced at her kids. Ethel and Will waved and headed down Gandhi Street. From there they took another tunnel that crossed into Zanzibar, then another that led them to Liberty, the North American enclosure. When they entered Liberty Square, dominated by the Marriott Hotel and the outpost’s Mormon Temple, they passed the Texas Steakhouse. Sean Manning and his family were eating dinner there.

Will nodded a begrudging hello. Sean nodded back, then he considered and beckoned Will over. Vera and the two boys looked at him suspiciously as he approached. “I just wanted to say that I’m glad to be back here with my family and thank you for making that possible,” said Sean.

“Sure. As I said to you the other sol, I’d rather have everyone here making a contribution. We may have a bit of struggle to survive here in the next few years.”

"The terrestrial economy's still contracting," agreed Sean. "Any idea what I can do?"

"You're still the ambassador, unless that's been taken from you."

"The State Department revoked my credentials this afternoon."

"I see. Your expertise at New Hanford was security. Why don't you go to Kent Bytown and see whether he needs you as a consultant? We can find a use for you."

"I hope so, because my American pension won't go far up here, and your government assistance will last only six months."

"Are you willing to take a loyalty oath?"

Sean nodded. "Yes, I'm willing. Our belligerency went too far."

"Then I'm sure we can find something for you to do, Sean." He offered his hand and the two of them shook.

Ethel turned to Vera and the two women's eyes met. "Would the four of you come to our house for dinner?" she asked.

Vera was startled. She glanced at her husband and the boys, then at Will. "Yes," she finally replied.

Marshall and Amy always sat at the same table in the Atrium. It was next to an orange tree that glowed almost like a ghost as one approached it because of all the light emitting diode strings wrapped around its branches to feed its leaves. They always took a minute to inspect its oranges.

They sat with their lunches. Soo and Guangya Kwok, two engineers from southern China who were close friends, joined them. Amy look at the full tray Soo was carrying. “It looks like your appetite’s better.”

“Yes, the morning sickness is finally ending,” Soo replied. She was now three months pregnant. “I’m feeling good enough to get a full day’s work in.”

“And we’re pretty busy,” added Guangya. “The *von Braun’s* radiators have several problems.”

“You’re not going outside?” asked Amy.

Soo shook her head. “No, I’ve got to stay in a low-radiation environment. I’m providing support inside.”

“What do you think of Yuri’s memo?” asked Marshall.

“Since I’m having a baby, I’m more cautious than I would have been a few months back,” replied Soo. “Saturn’s a long way away and there are no ideal places for an outpost. Enceladus is in the radiation belts, Hyperion’s a bit far out, Phoebe’s hard to reach because of its retrograde orbit. . . Titan’s frigid like no place humans have ever lived before, its dark, the thick atmosphere is a heat sponge . . . I think a mission abort back to Mars is worth considering. I’m not in favor of an abort to Callisto because we’d quadruple the size of the facilities there and we wouldn’t be in charge.”

“I wouldn’t head straight to Titan,” added Guangya. “I’d set up at Hyperion so we don’t have to modify the galleons at all for surface use; that way they’re fit to fly back to Mars. As for the Galileans, we don’t have the equipment and training for working there. What would the biologists, meteorologists, and geologists trained to work on Titan do?”

“There are plenty of things for them to do in the Galileans,” replied Marshall. “The geology of cryovolcanoes and icy mantles is basically the same in the Galileans as Titan and Enceladus. The biologists would be able to study the life in Europa’s and Ganymede’s oceans. The meteorologists were planning to study the weather of Titan and Saturn; they could study Jupiter’s.”

“But the politics would be messy,” said Guangya. “There’s already a jovian meteorology team; so we’d form a second team? Or would we become the numerous junior members of an existing team? No thanks.”

“Marshall, do you think we should abort to Callisto?” asked Soo.

“No, I’m in favor of continuing to Saturn. Half of our equipment is already on the way and arrives the same time we do or a few months later. Our equipment for 2070 and 2071 left Mars the same time we did. Some of the 2072 supplies are already at Gateway. We should go to Saturn, run a two-year mission from Enceladus or Titan, and reassess. Our vehicles and equipment are good until 2074 with existing supplies and spares.”

“I’d favor an abort to Mars,” replied Amy. “The situation on Earth is getting worse by the day. It may be impossible to get migrants and supplies to Mars next year. By the 2071 opposition, the terrestrial economy may be so bad that nothing will be flying into space. If nothing can be sent from Earth until, say, 2075, Mars will be in bad shape. They may not be able to help. And we’re a three or four year trip from Mars for cargo.”

“They said they would support us,” noted Marshall.

“But what if the pledge can’t be kept?” agreed Soo. “Let’s say Mars doesn’t get any supplies from Earth until 2075; seven years from now. Their computers will be

breaking down, and their communications networks, their satellites, their energy distribution systems. . . How will they be able to help us?"

"There's also Callisto, Ceres, Venus, and Mercury," added Guangya. "That's what worries me."

"And the moon; if people stay there, they may be turning to Mars for supplies," considered Amy.

"Let's say Mars can't get supplies from Earth for seven years," said Marshall. "In 2075 we'll have been in the Saturn system four years and our two galleons will still have two years of nominal functionality to them. We can always evacuate back to Mars then."

"That's true," agreed Guangya. "I'm playing devil's advocate here; I'd prefer to go to Saturn as well."

"I haven't decided," said Amy. "I think I'd rather stay four years and decide then."

"I'm not sure what the hurry is for this all-staff meeting," commented Guangya. "A lot can happen on Earth that can change the facts under consideration."

"Yuri wants to know where people stand," replied Marshall. "He's establishing a foundation for consensus that can change as facts change."

"And if we do decide to head to Jupiter, it'll give the folks on Callisto three months to figure out what to do with us!" added Guangya.

Ramesh Pradhan eagerly awaited the video reply from Gandhimohan Ramanujan. When the beep indicated an incoming call from the *von Braun* in the outer edges of the asteroid belt, he immediately played it.

"Good sol, Ramesh," began the psychiatrist. "I'm really happy to be in touch with you and to exchange these messages with you, but my friend, you really need to establish a professional relationship with a counselor at Aurorae. The round trip communications time is now almost two hours and I really can't give you the advice you need. Your feelings about your father really can't be fruitfully explored by video. You need the advice of a professional. I'm not talking about a mental disorder or pathology, I'm talking about patterns you developed decades ago that are disrupting your relationships and making them difficult. Sarah's divorce is a terrible blow and I'd hate to see you repeat the same situation again. Then there's the difficulty you occasionally have with your staff and the fact you weren't reelected. You're such a bright, talented, capable guy, Ramesh; think how much more you can do with all your talents, think how much more happy you can be if you can shake off the shackles of a few mental patterns.

"I'll be glad to have conversations with you, but you need to take action down there, my friend. That's my advice this sol. Ciao."

He watched Gandhimohan's face fade and he felt sadness. He had been quite a counselor, and since he had left for Saturn they had remained in contact several times per week.

He was tempted to record a reply about his father; lately he had been thinking through his terribly difficult relationship with his brilliant, volcanic, usually distant playboy father, partly because he could see the patterns reemerging in his relationship with his kids, and earlier with Sarah. But something else Gandhimohan had said struck him; use of the term "mental patterns." That was an ancient Hindu concept deeply related

to notions of yoga, and it made him think of other approaches to himself. He rose from his desk.

The Hindu temple was a ten minute walk across the outpost, and it was always open. He paused before entering to look at the additional statues that had been completed outside; Prajpati Ji, Ganesha's mother, was now finished and installed next to her elephant-headed son and his brother, Kartikeya, the embodiment of Mars itself; still missing was the great god Shiva, Prajpati Ji's husband and the father of the other two gods. Many members of the temple had criticized the emphasis on Shaivism—veneration of Shiva—displayed outside, so statues to Vishnu, the other popular great god, and of Krishna, one of his earthly incarnations, were also planned, followed by a statue of the Goddess, the third great expression of divine power in Hinduism.

He entered and went straight to the statue of Ganesha, his favorite deity, and performed a brief puja to him, silently praying that the god would hear his prayers and lead him to a new consciousness of himself. As if in response, the temple's priest, Siddharth Swaminathan, Gandimohan's much older second cousin, came out of his private quarters and entered the temple.

"Good sol, Ramesh," he said. "I heard someone enter and thought I should see who it was."

"Thank you. You teach yoga, don't you?"

"Teach it?" He laughed. "You make it sound like an adult education class. Yoga is not just a skill one acquires, like riding a bike. It is a vehicle of consciousness."

"That's what I want. I need. . . a guru."

"Why do you suddenly need a guru?"

“Because I’ve realized I have a lot of inner emptiness, Siddarth.”

“Inner emptiness can be filled with a lot of pain. It can create pain. But the pain can be drained away and replaced by enlightenment.”

“I need enlightenment, that’s for sure.”

Siddarth smiled. “Everyone needs enlightenment, but few will dedicate themselves to attaining it.”

“Well, I’m ready to. I think I am, anyway.”

The priest looked at him. “Think about it overnight and return tomorrow at dawn. Let’s see what sort of dedication you have.”

Will headed for his office early the next morning, feeling better about his job than he had for months. Mars was not yet out of the woods, but the crisis was no longer quite as nail-biting. He settled behind his desk with his yoghurt and pastry and opened messages.

An email from Marshall caught his eye and he opened it. It was a chatty account of the debate on board about where to send the mission, complete with anecdotes. He always enjoyed such reports and they made his relations with Yuri better because he had a feel for what was going on. He wished he had similar intelligence about Ceres, Mercury, and Callisto.

An email from his sister Molly, however, worried him. She rarely had good news. He hit play.

“Good morning, Will,” she began. “Where do I start. We’re at wits end trying to get money from bank accounts. My account at Third National has been frozen again; it was the last one that was still working, but I guess they finally couldn’t handle the

hemorrhaging of funds. All of yours are still frozen, right? There is a Bank of Montreal branch I can get to via train; do you still have any money there?

"I've got three families living in the house and we're cutting down the trees a lot faster than I thought. Wouldn't you know it, in spite of global warming they're predicting a cold winter. Bill Brooks still has a job at the local supermarket that's paying regularly in cash and he's very generously sharing it with everyone rather than paying his mortgage, on the theory the banks can't foreclose on everyone at once. But we really need an additional source of income. Three others have jobs, but they're either getting IOUs or direct deposits into intermittently frozen bank accounts. It's very unpredictable; suddenly you supposedly have a deposit, but either it hasn't shown up because the outgoing account is still under a freeze, or it shows up but your account is frozen so you can't withdraw it. Some are calling this a banking system collapse, but technically it's still functioning.

"Let me know if you can help. Various informal cash exchange networks are springing up, but you never know how reliable they are. Here in Stamford the Bahá'ís are pooling resources—I can write someone a check and they'll cash it when their account is unfrozen—but it's rather uncertain. I wish I had a pile of cash and could do the same, but I suppose if the word got out a gang would descend on the house and rob us. The other day over in New Canaan a gang showed up to rob a house and there was a big gun battle; cops from three towns were called in to arrest the gang after the house's inhabitants mowed down three of them with a machine gun. I don't want my neighbors to have machine guns, but that's what's happening. The police are setting up road blocks sometimes to catch criminals, but that causes delays and wastes fuel.

"Anyway, we're surviving and actually have fun together in spite of the inconveniences and worries. I'm praying for all of you; please keep us in your prayers as well. Bye."

He watched her face fade from the screen, stunned by her optimism in spite of grim circumstances. He could withdraw cash from his Bank of Montreal account in Canada, but he had already been told he couldn't use it at a branch bank in the U.S.; there were currency transfer restrictions in place. He also couldn't transfer money from a Marsian bank account to one in the U.S. It had become almost impossible to transfer money between planets; it was dependent on the movement of precious metals from Mars and that was now uncertain. It had even become difficult occasionally to use credit and debit cards on Mars, and they were the mainstay of the Marsian economy; some stores didn't even have cash drawers for bills and coins, and most people never carried them. The two Marsian banks relied on staff in Burma and Botswana to check financial transactions every sol or two, and the difficulties on Earth were interrupting their work.

Rather than calling Molly back, he called Roger Anderson instead.

"Hey Will, good morning." He left the video off; he wasn't dressed yet.

"Morning, Roge. Say, how have you transferred money to American relatives lately? My sister needs cash and I've run out of ways to supply it."

"Don't you have gold in a repository somewhere?"

"Ethel and I have some gold in Britain, but none in the U.S."

"It might not do any good to have it in the U.S. anyway, because if it's sold there may be no way to get the cash to your sister or for her to cash a check. You need to find a carrier service. They'll take cash to her."

“That’s a good idea. I’ll see whether she knows any Bahá'ís who travel to the U.K. and who could carry a few thousand dollars cash back.”

“Find out what the restriction is first. I bet the E.U. has slapped a big restriction on exports of currency. We need to institute a Marsian network. If there are Marsians with valuables in the U.S. they want to get out, maybe a complicated swap of assets could get you some valuables in the U.S. Gold’s going through the roof; it hit $62,800 per ounce last night.”

“I know; crazy, isn’t it? Our platinum export prices are collapsing but gold has soared and made up for it. Our income may go up at a time we can’t use it! But thanks for the idea of a swapping system. That’s something the government or the Chamber of Commerce could sponsor. I’ll talk to our economists.”

They chatted a bit, then Will closed the line and set up a video email to four experts about the Marsian government serving as an intermediary to move assets around Earth. Then he hurried to the situation room for a quick briefing. Yevgeny and Kent were waiting for him. “What did you think of David Alaoui’s email?” asked Yevgeny.

“I didn’t watch it yet.”

“Better watch it first. Kent will be interested as well.”

“Okay.” Will turned to his attaché and searched for the message among the dozen awaiting his attention. It was copied to five other people, including Yevgeny Lescov, Pete Theodoulos, Irina Mukhamadova of the Venus Commission, Rohan Choudhury of the Mercury Commission, and Koji Nakamura of the Lunar Commission. When Will pressed play he saw David gathered with Irina, Rohan, and Koji in Irina’s Paris office.

"Good sol, Will," he began. "As you can see, you've been invited to a little powwow in Irina's office. Of course, Koji can't represent the Lunar Commission; technically only Commissioner Ross Johnson can do that. But Johnson's in Houston and under the thumb of the U.S. administration; over the last three months Shackleton and Parenago have largely ignored him. Koji has been coordinating them from Japan. He's been able to limit American influence on the moon, thanks to the warning we got about the American shuttles heading for L1.

"We're meeting in order to figure out how to rebuild L1 and transportation beyond low Earth orbit. We can't do much without your involvement. Mars has eighty percent of the assets that were there. Your six caravels and one galleon are the key to everything because they are, in effect, long-period space stations. Stationed in geosynchronous orbit, one could coordinate the effort to turn on or off satellites; in low earth orbit, one could replace a destroyed station. Your two thousand tonnes of cryogenics and water are essential to transportation. There are a dozen functioning Swift shuttles at European, Indian, South American, African, and Australian spaceports; plenty of lift capacity for now, but they have no place to go. We're hoping we can arrange a space truce declared so the remaining assets will not be destroyed or confiscated, then reassemble a transportation system to serve all of us. Mars would be the main beneficiary because you need to launch migrants for transport to Mars in about nine months time. Those migrants could obtain a lot of the training they need by helping us rebuild the transportation system.

"What do you think? Irina, Rohan, Koji, and I are in negotiation to coordinate the situation on the moon, Mercury, and Venus as much as we can, but Martian solar sailers

and supplies are essential to all three operations if transportation from Earth is minimized. None of us can afford to be cut off from Earth, but together we can make progress in maintaining our facilities for as long as possible. We need to hear from you soon. Bye."

"Wow," said Will, digesting the message. "I wish we had initiated this!"

"We need to get Pete to Paris," said Yevgeny. "This was sent two hours ago."

"This has the potential of restoring much of our transportation, at least while the Swift shuttles have the spare parts to operate," added Kent.

"If Europe, Russia, and Japan can make the needed spare parts," said Yevgeny. "Right now they can't, and it does no good to have every spare part but one. It looks like refurbished parts will do the trick, for a while. If their economies muddle through, the Swift shuttles should be able to fly to the Ibis or another facility in low earth orbit. We may have to leave some caravels at Earth orbit rather than flying them back here."

"That's the price you pay for maintaining transportation," replied Will. "They didn't say whether the Grand Union is involved. That's essential for this to work. I think we should call in the Commissioners for the Asteroid Belt Commission and Saturn Commission as well because they have the same concerns. Let's assemble a room full of folks up here and negotiate with the room full in Paris."

11.

Sadness and Hope

Early March, 2068

The sun was barely slanting across the garden around the Bahá'í House of Worship when Will left the building, still packed with worshippers, and headed for the office. He was barely feeling better after half a night of sleeplessness. He was heading up the steps of the Commonwealth Building when he abruptly reversed direction and headed back down. He decided to walk to Mariner Hospital instead.

Cornelius Beyer, the hospital's chief physician, was still in the emergency room when Will entered. He beckoned Will to a conference room down the hall. "Good sol," Will said. "Any new ideas why she did it?"

"No." Cornelius entered the room and closed the door behind them. They sat in two chairs facing each other across a table. "Clearly, she was distraught. Pedro told us that Miranda's mother had been in San Diego visiting her sister when the city was bombed; it's now been almost six months and she's still missing. Her brother was working in Dalian when the Americans nuked the port and he's still unaccounted for. Then last week her father, who was living in Monrovia and who had been chronically depressed for months, got drunk and had a severe automobile accident. He succumbed to his injuries three sols ago."

"Oh, Lord." Will shook his head. "And a close family, no doubt."

"Pedro says the family was very close, so Miranda has felt immensely guilty that going to Mars kept her so far away during the crisis. She was able to send money to them,

so they were in better shape than many Liberian families. But her mother used some of Miranda's money to go to San Diego; that devastated her."

"Any other brothers and sisters?"

"No, just aunts, uncles, and cousins."

"Who's planning the funeral; Pedro?"

"Yes. Father Greg's going to help; he's been here since 3:30 a.m."

"Was there anything we could have done better?"

"No. She remained conscious long enough for the airlock to completely depressurize and she went outside about ten meters before she collapsed. The crew closed the airlock and repressurized it, but when they opened the inner door they found it was empty. It took six minutes for someone to pull on a pressure suit and go outside to grab her. By then it was too late. It did a lot of damage to her brain and eyes. She'll have to have a closed casket."

"I'm impressed someone managed to get outside that fast."

"The woman who retrieved her went out with a suit and helmet but no backpack."

"I'll have to decorate her for heroism; who was it?"

"Lea Caton."

Will nodded. "Her brother died in a riot in Adelaide in January."

Cornelius nodded silently. "You look like a wreck."

"You said there was nothing I could do and I shouldn't come down, but I couldn't get back to sleep. I should have come down anyway."

"Get some coffee and a doughnut. That'll help."

Will shook his head. “It’s March 2; the first sol of the Bahá'í fast. I had my breakfast right before dawn, including two cups of coffee. Now I have to go twelve hours before eating and drinking anything.”

Cornelius scowled. “Can’t you retire from that?”

“The fast ends at age seventy, so I’ve got three left. The first few sols are the roughest, then my system adjusts. But you tend to get tired the first sol, and getting three hours of sleep won’t help!”

“Then go home and sleep. Pedro’s still here; do you want to see him?”

“I don’t think I know him, but I should say something. They were committed to each other?”

“Engaged to be married in June and living together.”

Will nodded and began to think of what he could say. Cornelius opened the door and led Will down the hall, past the intensive care area and the surgery suite to the main ward. Mariner Hospital was equipped to handle up to fifty patients at once in case of an emergency, but it rarely had more than three or four, mostly expectant mothers. Its rooms could accommodate two patients, but in practice everyone had private rooms; any family members who wanted to stay near their loved one were accommodated in the vacant rooms. The nursing staff, trained to handle large emergencies, usually had to host as many non-patients as patients. When someone suffered a loss they were often invited to stay a sol or two, where staff could help them with their grief.

Pedro was lying on a bed in his room and Will recognized him as the young Colombian whom he had encountered on several occasions, most recently in his ranger uniform after New Hanford’s surrender. “Pedro, I’m so sorry,” he said.

Pedro sat up, startled. “Chief Minister Will, what a surprise.”

“I was told that Miranda’s fiancé was named Pedro, but we have many Pedros up here and no one told me your last name. So I didn’t realize I knew you. I remember meeting her as well; the two of you were sitting at a restaurant in the square back in December. I was so shocked.”

“I was too. I knew she was extremely depressed, but she did come to the hospital once and she told me she would attend a grief circle. Then she told me she needed some time alone to deal with all the death. I should have said no, she couldn’t be alone, but I agreed and moved in with a friend for two nights.” He shook his head.

“Don’t blame yourself. No one could have anticipated this. People are not predictable.”

“I know. But the meaningless of all of this . . . ” He shook his head. “A good God would have intervened.”

“If the Good Lord had intervened this time, there’s no guarantee anyone would have learned anything, and she might have tried again. So I guess the question for us is what can we learn from this tragedy and what good can we make from it. We can’t bring back Miranda, or her mother or father or brother. At least they’re all together now. But we can try to do something to preserve their memory.”

“I would like to do something to remember her.” Pedro’s voice trailed off.

“Well, this isn’t the time to plan that now, but the time will come.”

“Where do you think she. . . is?”

“We Bahá'ís don’t believe in a heaven or hell, we believe in a next world of infinite spiritual progress. So she’s in the next world now, and she’ll progress there, just as she progressed here.”

“So. . .you don’t think she’s separated from her parents or brother?”

Will shook his head. Pedro looked relieved. “I hope no one said she’s in hell.”

Pedro hesitated. “When I asked Father Greg, he really didn’t answer.”

“I can’t give you empirical data for my conviction, and I’d rather not call it faith. It’s trust. I trust that she is with them now, and they are enfolding her in their love.”

Tears came to Pedro’s eyes, and he nodded. “Can you say that at her funeral?”

“Of course, whatever you wish.”

He nodded. “Thank you, that would be good. This is Mars’s first suicide. It’s important for everyone that you speak.”

“It’s a huge shock for everyone. It’ll take us a while to work through it.”

“Good, then at least I can help with that.”

“I’d better go. Let me know if I can be of any help, okay?”

Pedro nodded. “Thank you. Ciao.”

“Ciao.” Will turned and headed out of the room, feeling a bit better.

When he got to his office, the morning emails and videomails quickly soured his mood. The morning media digest from Jacaranda’s staff was not good. The European Union refused to recognize geos printed in Latin America. The Latin Americans had reneged on their currency agreements and had been printing too many bills that were geos on one side and latiñeros on the other; secret negotiations had not resolved the problem; the Russians and Japanese had agreed to support the euro/geo currency and continue to

create ruble/geo and yen/geo bills according to currency quotas. The latiñero, cut loose from the other currencies in the geo family, was falling in value; stock markets and banks from the Rio Grande to the Pampas were closing temporarily; Eurasian stock markets and banks, which had been intermittently open during the first two months of 2069, were closed again. Rumors in New Zealand, Pakistan, and Turkey said those countries had been cheating as well, prompting runs on banks and unrest. Turkey was imposing martial law. Commodities prices were fluctuating wildly as everyone tried to anticipate who would buy petroleum and other essentials with what currency.

Reports about launches of people and supplies to earth orbit were equally worrisome. Shuttle spare parts had run out in Australia again; cryogenics were in short supply at Kourou and Alcantara because of electricity and petroleum shortages. The Japanese and Philippines spaceports planned to remain closed for the next few months, depriving Mars of additional launch capacity. The schedule for the rest of the year was getting impossibly tight. Will had all that in mind when he went to the cabinet meeting at 8:30 a.m.

"Let's start with Yevgeny and his bad news," Will suggested.

"I was hoping to hide behind the others," replied Yevgeny. "Opposition is in nine months; we have to have everything and everyone launched in seven. We've got three hundred people in orbit or on the moon right now, waiting for the flight to Mars. It's still theoretically possible to get fifteen hundred people to orbit in time; that's thirty flights of fifty each, or one flight per week. We can manage forty-five flights by October. The problem is that we also need to haul up cargo, and the other fifteen flights can haul only three hundred tonnes. That's more that enough to get them to Mars; we need to lift about

two hundred tonnes of supplemental consumables and spare parts for the flight itself. But to employ them here profitably we need five hundred tonnes of cargo, and a thousand tonnes would be better."

"How many of the people who are available have been trained?" asked Emily.

"Maybe half. Five countries have imposed a brain drain ban on their citizens going to Mars: China, the U.S., Pakistan, Taiwan, and Germany. Some are defying the ban. Others don't want to leave loved ones behind during the crisis. They've either asked to come here next columbiad or to bring their loved ones along. Then there are the tens of thousands of unemployed, idealistic young professionals who have applied and who have no training at all."

"About half the residents of the moon want to come," added Moses. "Some of them have excellent skills."

Yevgeny nodded. "But even some of them are asking whether their families can come. We have two spouses and three teenaged children on the moon right now who managed to pay the tourist rate and want to stay."

"Really?" said Will. "That's a lot of money!"

"Some of the high-placed staff at Parenago make a lot of money and they get travel discounts. Parenago has shut down; the price of platinum has plunged to a tenth of what it was and Parenago isn't profitable. The situation won't change for a few years unless people suddenly discover the beauty of platinum jewelry."

"We're losing money on Uzboi as well," said Yuki Tajima, the Ministry of the Treasury. "The mining companies are concerned about the bottom line and their stock value is taking a beating. They want a break on transportation costs."

“We have to give that,” agreed Yevgeny. “We might as well fill the cargo vehicles with something for the return trip to Earth. We can’t mine gold fast enough and it’s selling for outrageous prices. We’re totally dependent on gold sales.”

“Is the moon still insisting on gold for purchase of cryogenics?” asked Will.

“Yes,” replied Yevgeny. ‘They’re not interested in swapping for Marsian consumables, they want gold and they want it at 2,000 geos per ounce.”

“That’s outrageous!” exclaimed Moses. “It’s worth a dozen times that much on Earth right now!”

“They’re arguing the price can’t last and they want a gold reserve for buying supplies for at least a year. Besides, they have us over a barrel; we don’t have enough hydrogen and oxygen fuel at L1.”

“Even with the nukes?” asked Will.

“It may be possible with the solid-core nuclear engines, but it’ll leave our L1 facilities with too little fuel to maneuver if another attempt is made to capture them.”

Kent Bytown laughed. “No one has the fuel and equipment to do that!”

“They could if they captured a functioning spaceport,” replied Yevgeny.

Kent nodded. There was silence a moment, then Will said “Ruhullah’s holding out for as high a gold price as possible, and I suspect he’ll talk the Lunar Commission up a bit. If they’re willing to go up to 2,500 geos per ounce we should accept. The moon needs help and gold is a landfall for us.”

“And these prices won’t last,” added Emily. “Every old gold mine on Earth is being reopened.”

Moses said, “How many people can we fly here in the fall?”

Yevgeny laughed at that. “Who knows? How much risk do you want to take? We’re flying consumables from here to feed them on the flight, but if either cargo vehicle is lost we’ll have to reduce immigration. We’re flying water to Gateway, but Gateway can’t convert it to hydrogen and oxygen fast enough, so we have to buy from the moon at whatever price they’ll charge. We’re going to fly methane and oxygen to Gateway but it’ll arrive too fast to aerobrake, so we’ll have to use up two thirds of it to slow down the rest. We’ll stagger departures over as much time as possible. If we have the fuel, flights will go faster; if not and we have the food, they’ll go slower with fewer passengers. It’s an extremely complex dance of numbers based on extremely unreliable launch schedules.”

“My view has always been, fly as many people here as possible,” said Will. “Equipment is important, but with more people we can repair or manufacture a wider range of things and do them with less equipment.”

“For now,” replied Emily. “We have spares to press into service. But when things start to break and we don’t have spares we’re going to enter a very different situation. There will be huge inefficiencies, greater dangers, frustration, job dissatisfaction, uneven income distribution, and all sorts of difficult adjustments. It’s a trade off; fewer people and more efficiency, with less stress and social strife; more people, less efficiency, more stress and social dislocation.”

“I agree,” said Will. “But even if the economic output is the same in both cases, more people is what Mars needs.”

“Not if our image as a harmonious, efficient, just, prosperous place is damaged. That could translate into *less* growth later, and we’d be stuck with a less happy world.”

Will paused to consider and the room got tense as everyone looked at the boss. “Let’s make our best guess where the balance lies,” he finally said. “Some of you are in favor of slower growth. I’m in favor of faster growth, but I may be wrong.”

“We also have to import as much of our nominal cargo as possible,” exclaimed Yevgeny. “The passenger flights will be launched by November 1. Throughout early 2070 we should be able to launch cargo and load it onto solar sailers for arrival here in 2071. Our spares should be fine through 2072. I don’t think we can anticipate a great amount of social displacement because of broken motors and computers.”

“We have an incredible repair staff,” said Moses. “The Road Building Department crew has been developing repair skills for six months. We can custom make almost anything mechanical.”

“Marcraft’s trying to import a dozen engineers who have been central to the manufacture of Russian rocket engines,” added Yevgeny. “With their expertise, even with existing equipment, we’ll be able to manufacture shuttle engines.”

“I suppose if we can import computer chips, vaccines, and a few other fairly low-mass essentials, we’ll do alright,” conceded Emily.

Will nodded. “I think so. We have 7,500 extremely talented, smart people. This time next year it’ll be between 8,500 and 9,500. We’re pushing *ten thousand.* Natural increase will get us there in two or three years. We’re big enough to achieve significant levels of self sufficiently. If we are completely cut off after next year, I think we’d do fine.”

“Including supporting Mercury, Venus, Ceres, Jupiter, and Saturn?” asked Emily.

Will shook his head. “No. None of them are close to being economically viable and we can’t afford to support them all. Magellan is safe until 2070. Mercury could be evacuated in stages over a ten year period; the existing equipment would be safe for that long as the strain on it progressively decreases. Ceres would have to come home in four years. I’d concentrate on Saturn and Jupiter, since they’re the hardest to reestablish and probably will retain terrestrial support the longest.”

“The Chinese are committed to Callisto,” agreed Yuki.

Will turned to her. “How’s the money holding up?”

She smiled her mysterious smile. “There’s no new crisis to report. With the redirect of incoming gold shipments to Australia and Latin America, we have the revenue to cover next year’s launch costs. But we still can’t buy many things from elsewhere because of the near-collapse of banks and currencies. We’re dependent on gold prices.”

“And what about currency transfer offices?” asked Will.

“We’re opening one in Pakistan in another week for that country and Afghanistan. Fifty people up here have applied to transfer funds to relatives. A third India office is opening, in Kolkata. We’ll have offices in Korea, Philippines, South Africa, Nigeria, Egypt, Spain, Venezuela, New Zealand, and Norway next month.”

“The New York Office has worked very hard; I’m very impressed,” said Will. “My sister is immensely grateful.”

“Being able to transfer funds to one’s relatives has helped morale up here too,” exclaimed Emily.

“But people are buying less up here,” added Yuki.

“And that’s stressing businesses; it’s been a disaster for some of them!” replied Henry. “We’ll have to bail out a few of them.”

“But we’ll bail them out Mars-style,” replied Will. “We’ll give them a work contract or employ their staff temporarily doing something else.” He turned to the Minister of Health and Education. “Simin, what about the sad events of this morning?”

“I’m glad you’ve been asked to speak at the funeral. You need to give people hope. Almost everyone has had a family member die; sometimes it’s a second cousin or the brother of the wife of a cousin. Everyone has heard all sorts of stories of suffering, fear, and hopelessness. Sometimes they’re stories of terror; I’ve heard quite a few in group therapy sessions. Add to that the enormous uncertainty up here; whether we’ll be physically cut off for a decade or even for half a century, whether our lifestyle will slip into poverty, what life will be like for our kids. . .”

“Rubberized cotton pressure suits and wind mills for power,” said Moses derisively. “We could be cut off a century and wouldn’t decline to that.”

“But people don’t know that,” replied Simin.

“Neither does Moses,” averred Yevgeny. “I’m not so confident that we can maintain our technology.”

“I think we could maintain space flight capability,” responded Moses.

“Be that as it may,” intervened Will. “Simin, you’re point’s well taken. I sense a fear of social decline, that we might have to resort to a dictatorship ultimately.”

“You need to address that too,” agreed Simin. “People need to be reminded that we have incredible cultural resources; incredible *moral* resources up here. Those resources make our form of government strong and effective.”

“I agree,” said Will. “Yevgeny, considering how much people are worrying about their families, and considering we’ll have to scramble to fill some berths, I think we should set up an office to arrange for entry permits for relatives of Marsians.”

“What about psychological tests and education, though?” asked Yevgeny.

“Psychological tests, yes; we don’t need to import trouble. But we’re screening out only about ten percent of candidates with them anyway. I wouldn’t worry about education because people can be trained here and we have a shortage of low-skilled workers. We’ll have to do a lot of training on the flight because our terrestrial training efforts have been screwed up for months. If there are vacancies on the shuttles, they should be filled by family members.”

“Even a few family members immigrating will boost morale,” said Simin. “This is a society without grandparents, uncles, and aunts.”

“Okay,” agreed Yevgeny. “I’ll set up a desk to facilitate arrival of relatives and will circulate the revised selection criteria.”

Will turned to their roadbuilder. “Moses, when will we have a report on self sufficiency? I’ve heard very different views from the members of the task force.”

“That’s because we’ve spend hours arguing about which scenarios to plan for; there are so many possibilities. But we’ve now reduced them to three basic scenarios and we’re figuring out which plan works best for all three. We’ve greatly reduced the numbers of ‘essential materials’—alloys, chemicals, and plastics—by figuring out which can substitute for which and under which circumstances, and we think we can develop a plan to manufacture all the essential materials. The result is a much shorter list of essential imports. We’re still weeks from a final plan, but we’re optimistic.”

“What are the three scenarios?” asked Simin.

“Fifty tonnes of essential imports this columbiad, then a near-normal importing environment next columbiad; fifty tonnes this time, then none for four years; fifty tonnes this time, then none for a decade. We’re prioritizing the import list so that we have a plan for any quantity of imports over fifty.”

“We need a briefing from the task force at the next cabinet meeting,” said Will. Does anyone have anything else?” He looked around. “If not, then let’s get to work.”

The funeral was at noon three sols later in the Catholic Cathedral, a large, impressive structure of fake-stone vinyl and sheet rock hung on nickel-steel beams, with classic works of religious art wallpapered onto the ceiling and walls, and windows of “stained-glass” plastic. The cathedral was packed to the doors and others sat in the square outside to watch on a large screen.

Bishop Miller himself presided over Miranda’s funeral mass. Will Elliott spoke after the communion in an interfaith addition to the program. The church fell silent as he stood at the podium and looked over the crowd.

“The last few sols have been times of sadness and hope. I remember meeting Miranda a few months ago in Andalus Square right after New Hanford’s surrender. It was a time joy and hope for us, but she was sad because of her mother and brother, and worried about her father. Subsequently Brian Stark and Jen Tan visited her and brought her comfort and renewed hope. This is the Marsian way: when someone with whom we identify has hurt another, we express our compassion for the victim and grief for the act.

"Many others assisted Miranda as well. Pedro, her steadfast love and support, tried hard to help. She was often invited to share her grief and fear with those who understood and could help her heal. Yet in spite of these efforts, she could not bear the reality that was crushing her. All of us have experienced the terrible darkness that threatens to engulf us when loved ones suffer or are lost. If there is one lesson I hope we have all learned in the last half year, it is that the only response to suffering and loss is to love. By giving we help heal others and our own grieving hearts as well. When death breaks earthly bonds, we create strong new ones. Our love reinforces the tenderness showered on our departed one by ancestors and others in the great beyond.

"The last half year has been a season of grief, pain, and uncertainty for all of us. Perhaps it is time we reviewed our response to the world crisis. Last fall the existence of our nation was fundamentally threatened. Except for three lives unintentionally taken in an act of self-defense, we killed no one, we injured no one, and we threatened no one. Those who obediently implemented the belligerent will of their government against us have been forgiven and live among us. So far there is no reason to expel any of them. They were offered the chance to contribute to this new society and they accepted. In consequence, they have been welcomed.

"Our own society and economy have suffered severe disruption. We have responded by rolling up our sleeves and working extra hours. Cryogenic storage facilities are going up at every outpost. New repair facilities are being built. Old equipment lying in Junkyard Crater has been retrieved and given new life. Marsian substitutes for a dozen items unavailable from Earth are in production and several score more are on the way. When Aurorae's power supply returned to normal, demand was permanently down by

five percent because of new efficiencies. Our ‘Ideas’ web pages have received thousands of suggestions from Marsians and Earthlings alike.

“Our friends and loved ones on Earth have suffered severely, and sometimes they have paid the ultimate price for the blindness of self-serving nationalism. We have responded by giving one hundred forty million redbacks—twenty thousand redbacks per Marsian—individually to needy ones we know. That’s almost a tenth of our personal income over the last half year. As a government we have given half a billion redbacks to charities devoted to the needy. History records no people who have been more generous in the face of grave uncertainty about their own fate.

“Uncertainty continues to gnaw at our resolve and sap our energy. But the last half year gives us every reason to hope. We live in a society with a higher level of trustworthiness than any society in history. It has been attributed to our small size, our training, and to the virtue of necessity, but it can also be attributed to the fact that we have no economically desperate people, that we have never had to cut corners morally to get ahead, and that we generally create new rules based on reason rather than political compromise. We walk into a small store to buy something, find a sign by the owner that she will return in an hour, we do our shopping, pay for our purchase, and leave. Theft is virtually absent. We employ fewer government inspectors than authorities of similar size but find less evidence of violated regulations and laws. Our children can walk about in complete safety. We encounter languages, clothing, foods, and customs different from ours ever sol and we respect them. And when it comes to electing our government, we consider not what the elected ones will do for us, but *how* they will act. Will our leaders

be moral people? Whether we are religionists, atheists, or in between, we share certain moral values of trustworthiness and honesty and expect them of others.

"And herein lies the promise of our success. My friends, as long as we keep our trust and our honesty, we will be successful as a people. We cannot be sure what lies ahead. The next few years will bring their share of hardship. We will have to work harder than ever before. Our circumstances will be straitened. We will not always be comfortable. But even if we are completely cut off from Earth—a contingency that looks unlikely—we have the training, equipment, human resources, resolve, and will as a people to thrive. If necessary, we can continue unassisted the human impulse to explore and expand outward into space. Even if we can import nothing from Earth, we can still export wealth and give it away to better that world. We can be a balm for the suffering of distant ones and by our example we can give them hope for a better future. Let us continue our efforts. We can do no less for Miranda's sake."

12

Joy and Promise

March 8-15, 2069

Anne Hollingwood knocked on Will's office door. Have you a minute?"

Elliott glanced at the chronometer on the wall. "Literally one minute; the Chinese ambassador will be here at 9:30. How can I help you, Anne?" He rose reluctantly from behind his desk to join her at the conference table inside the door.

The Mayor of Aurorae picked up on the Chief Minister's reluctance. "I won't be long. I need your help and I'm afraid there's no way you'll help me. This bilingualism bill before the Aurorae Borough Council is poorly timed. This is no time to divide our loyalties by requiring businesses to buy signage in two languages. I know it looks good in terms of supporting diversity, but it will foster ethnic segregation. Do we want all Chinese in Cathay and all Indians and Pakistanis in Punjab? Does English become an 'ethnic' language in Liberty Dome? Is there any point requiring all signs in Zanzibar Dome to be in Swahili and English when we have so few Swahili speakers? Where does this end; a high school education in twenty languages?"

"Anne, no one has asked for physics courses in Spanish or biology classes in Hindi. This proposal is an extension of our existing outpost design; Cathay has Chinese architecture, El Dorado looks Latin American, Baltic looks northern European. If those domes require business signs in Chinese, Spanish, and Russian, it reinforces the ambiance of those domes. It's hard to preserve Latin culture without preserving Spanish. Sure, let's have signs in Swahili and English in Zanzibar. Why not? No one will be confused, everyone knows English."

“But New Tokyo plans to expand its Japanese-language area to the casino district adjacent the Dacha.”

“It is part of the village of New Tokyo. And New Tokyo Dome itself has very few signs in English right now. That’ll change.”

“What about ethnic concentration?”

“Do you know there will be movement of peoples? Not all Chinese in New York live in Chinatown.”

“I can see you’ve made up your mind.”

“Well, you said you doubted I could help you. I don’t think you should worry. We’re still not sure what ‘generic Marsian’ is. People are intermarrying at a pretty high rate; I’m sure there are half-Chinese half-black kids studying Spanish in Mariner High.”

“Yes, that’s true, but I’m not sure that’ll be enough.” She sighed and stood. “I tried. I’m still opposed to the bill.”

“I’m not planning to attend the meeting, if that’s any consolation. How’s everything else?”

“Okay. My brother and his son have applied to come and I hope they make it. I’ll have two fewer people to worry about.”

“I hope it works out as well.” Will saw Professor Zhou Tao approaching his door. “We can talk later, if you have further ideas. Ciao.”

“Ciao.” She turned to the door, greeted the ambassador, left, and closed the door.

“Good sol, Ambassador Tao, please come in.”

“Thank you, Mr. Chief Minister. How are you this sol?”

“Quite good. Let me get you your usual cup of coffee.” Will rose and filled a cup with black Marabica.

“I’m sorry to be drinking while you’re fasting.”

“No, no, don’t worry. It’s been a week now and I’m adjusted to it. It does seem a bit harder this year; maybe because I’m older, or maybe it’s the stress.”

“It could be that!”

“Last night my government sent a message of congratulations and best wishes to President Wong. He has a huge task ahead of him and we hope he will be successful.”

“Indeed. Thank you for the message. A copy was forwarded to me and I’m sure you’ll receive thanks from Beijing soon as well. These have been terrible times in China. One must go back to World War II to find a comparison.”

“The suffering; it was a terrible winter. The entire northern hemisphere had a terrible winter. But the psychic impact, what has been called ‘loss of empire’; that’s worse for some people.”

“For the prosperous class that was able to stay warm and fed, that has been the bitterest pill of all. Their outrage forced this change in government and now everyone fears the new government won’t be able to please the people and will be weak, leading to further losses of territory.”

“The only hope of getting Tibet and Shinjiang/East Turkestan back may be joining the Grand Union. Possibly they and China could be convinced to agree to a special relationship.”

Tao laughed. “Not for some years, Mr. Chief Minister! These new so-called nations are too proud of their independence and China is too angry over losing them. I

suspect the conflict will continue several years and many will die. Meanwhile, Taiwan hasn't even bothered to declare its independence and they've applied to join the Grand Union!"

"That would have been unthinkable a year ago."

"Exactly, but now China's weak and the Grand Union is mad at her. What do you think of the developments in America? What do you hear about the impeachment proceedings? And to make things even more complicated, the Speaker of the House just died of a massive heart attack!"

"That shouldn't affect the procedures much, since they're now in the Senate. I hear what everyone else hears; the *New York Times* and *Washington Post* are as good a source as diplomatic dispatches. Now that warm weather has started, the state of emergency will end, so the impeachment proceedings will start. Everyone says they'll go quickly. If President Knight doesn't resign, he'll be out by May, and I suspect they'll impeach Vice President McKay as well, and maybe Secretary of State Vanstone. Of course, what is really needed for world peace is a trial by the International Criminal Court, but that won't happen."

"No, not in a million years," agreed Tao. "I worry for the United States. Your words at Miranda's funeral got me thinking about the importance of a moral orientation in the electorate and particularly in the elected leadership. I see the contrast when traveling between countries. Those with a formerly totalitarian system have populations who strive to get ahead by any means. They don't trust a moral path and don't think it will work. Sometimes, their governments are elected mafias. Russia still has this form three generations after the fall of Communism. The Europeans, generally, have the most

moral population and government right now; and note they are not religious! The American government has been deteriorating in quality for most of the century."

"Yes, from election spending on the media," agreed Will. "Americans used to worry about demagogues. Maybe now that they've elected three presidents who claimed they'd bring religious and moral values to government but brought corruption and chaos instead, they'll be wary of such claims. But the vast expenditure of money makes it difficult to know who you are electing; that's the real problem. You have to choose between two pairs of competing images, one pair flattering and positive, the other pair nasty and dangerous. It leaves the electorate helpless."

"It does, but I don't see the 'Marsian alternative' making headway any time soon; in fact, the Marsian approach could deteriorate as well." Tao sighed. "Mr. Chief Minister, I'm afraid my visit this sol concerns a very important and delicate matter. As you know, for the last month we've been talking to Yevgeny Lescov and Mikhail Shtokman about the needs of the Callisto mission, and they have been very gracious in accommodating us as well as they could, considering the circumstances. We've developed several cargo scenarios—"

"Yes, and did you hear we're fairly sure we'll have access to Nairobi Spaceport? It's mothballed, but the hydrogen and oxygen production and storage facilities are functional and we can get a contract for jet fuel for the first stage and petroleum to power the electrolysis. I gather it is still possible to purchase liquid hydrogen and oxygen from your Hainan facility—"

"No, Hainan is not possible. I'm glad Nairobi will be available; I assume shuttles will take off from the other spaceports and land at Nairobi, then take off from there and

return to one of the others once they have fuel for the next flight. It's good for Nairobi's business and increases your flight rates. The issue I want to talk to you about is payment. We anticipate paying Mars for its services in 2070 or 2071."

Will blinked. "I beg your pardon; one or two years?"

"That is correct, Mr. Chief Minister. The treasury cannot accommodate the outflow sooner."

"You're talking about the costs of transport to Mars; what about the costs of transport from here to Callisto in mid 2070?"

"We can't pay before 2071. The lease payment for the Deimos and Dawes Reservations will be delayed at least until 2071."

There was silence in the room. "We're talking about transportation costs to Mars of one to three hundred million redbacks, depending on the quantity we manage to lift, and the same amount to Callisto, and seventy million redbacks of rent. That's a *lot* of money."

"Mr. Chief Minister, our two countries have always had excellent relations, and in this time of need we are asking you to trust and accommodate us. In your time of need we stood behind you. As you know, Callisto is in serious need."

"I am aware of Callisto's needs, primarily a shuttle to replace the one with two bad engines—a lot of refurbishing work for our spaceport—and parts for the outpost's radiators. But Mr. Ambassador, I would be remiss in my obligations to Mars if I allowed an I.O.U., especially considering the wide range of facilities that you could sell to us."

"Mr. Chief Minister, our reactors are not for sale."

"Why not? The Cassini reactor is worth three hundred million redbacks. We will have enough difficulty providing supplies to the Jovian Commission outpost on Callisto, and they only need fifty tonnes. If China can't supply its Callisto outpost itself, it can always send them home; that's the safe alternative."

"No, we want to keep them on Callisto and provide modest personnel turnover."

"And Mars is going to pay for that as well? Because the U.S. is out; they're not giving us a cent for anything. The former Jovian Commission/Mars/U.S. joint mission is now a Marsian responsibility. So you are asking us to include your personnel on the caravel we'll send; that adds even more to the cost. And China does not want to fold their outpost into ours to create a joint command."

"No, our Callisto outpost will remain ours."

"That's fine, but I'm afraid you'll have to pay. That's the way it is, Mr. Ambassador. We want the Cassini reactor. We'll let your people harvest the plutonium for your own use, but we want it under our command."

"Mr. Chief Minister, we are no danger to your outposts. We have reliably provided you with power for many years."

"You have, I agree. But we will never be dependent on outside energy suppliers again. Promises are never guarantees."

There was silence in the room as Tao thought. "Sale of the reactors is unacceptable to our government. I know that."

"I'm surprised that a nation as rich as China can't afford half a billion redbacks. Your economy is now fifty trillion redbacks."

“Is it? No one seems to know how big our economy is. It’s contracting thirty percent this year.”

“That means the 2069 economy is equal to the 2061 economy, which was a Chinese economy that did incredible things. It’s an economy a dozen times bigger than the 1960s American economy that sent Apollo to the moon.”

“Yes, but when an economy contracts severely some sectors contract more than others, while others—notably police, security, and the military—must expand greatly. Our nation is prostrate, Mr. Chief Minister.”

“Then sell the Cassini reactor.”

Tao shook his head silently.

“Then sell it with an option to buy it back.”

“You’d sell it back to us?”

“Maybe.” Will smiled.

“That might work if we had some guarantees about the plutonium. We wouldn’t want the Americans to have access to it, and we wouldn’t want to pay an excessive fee to recover it.”

“Mr. Ambassador, if we acquired title over the reactor in return for support of your Callisto and Deimos outposts, we’d be willing to give you an exclusive contract over fueling; you bring new fuel pellets and haul away the old ones for free. That would reduce your costs because we would be paying for routine reactor operations, you’d be getting all the plutonium, and we’d have control over the reactor. I could argue in favor of a contract like that.”

"Perhaps that would be acceptable," replied Tao. "Mr. Chief Minister, if Margen signed a contract to operate the reactor, we could keep the title, but your people would have complete control. An arrangement like that could be extended over the Jumla reactor as well if supplies and support for our other facilities were included. This is not the time for China to give up territory on Mars. It's had to give up too much on Earth."

"I see your point. China has been a steadfast ally. I could bring the idea to the Cabinet. We'd like a clause saying that at the end of the lease we get the land back."

"That may be acceptable, I can argue in favor of it."

"Good. Let's see what everyone says about the idea."

Tao rose. "I will summarize the results of this discussion to my superiors. Dialogue and compromise often can bring about results that work for everyone."

"Indeed." Will walked him to the door, shook hands, they exchanged ciaos, and Zhang Tao left. Will went back to his desk wondering whether a hardball approach—give them nothing—might have resulted in a reduced Chinese presence on Callisto, a unified mission structure there, *and* control over the reactors. Tao, after all, had admitted that the Chinese government could not resupply his facility, something that Will already knew. But hardball tended to produce adversarial relationships and bad feelings. It brought no friendship when one might need a break.

He turned back to his messages, then glanced at his chronometer. It was 10 a.m. already! He was startled that it was so late. The caravel *Centaurus* with Liz and Mike on board was scheduled to aerobrake into Marsian orbit starting 9:42 a.m.! By now it must be in orbit. He turned to his attaché. "Anisa, did you get the entire conversation with

Ambassador Tao? Can you send a transcript to Huma for summary and dispatch to the cabinet?"

The artificial face of his automated secretary appeared on another screen on his desk. "Huma already requested the transcript. I'll tell her to send the summary."

"Thank you. Please connect me to the Situation Room."

"Immediately." Yet another screen on his desk—the one usually used for videophone calls—sprang alive.

"Situation Room, this is Tammy."

"Tammy, did the *Centaurus* aerobrake into orbit?"

"Yes sir, it was a nominal atmospheric passage. The caravel's now in an orbit. . . 250 kilometers periapsis and 5850 kilometers apoapsis."

"Spot on," replied Will. The apoapsis was just below the orbit of Phobos, allowing that moon to send rescue vehicles easily if necessary. "Thank you." He closed the connection with a smile. They were back.

It was five sols before a shuttle descended from orbit with Liz and Mike. Theirs was the third and last shuttle load of arrivals; during the crisis Mars was flying shuttles less often and making more inspections to stretch out their service lives. Will awaited the arrival of the personnel on all three shuttles to welcome them to Mars—he had always welcomed everyone who had landed at Aurorae for the first time—but shuttle three was special for him and Ethel.

Two conestogas pulled up to the shuttle and received its fifty passengers. The conestogas then drove to Aurorae's arrival hall, where Will shook hands with everyone.

Departure from the conestoga was slow and casual; each new Marsian was greeted by his or her buddy, a Marsian willing to serve as a big brother or sister and help the migrant get oriented. After the last six months of threats and isolation, the arrival was a joyful event.

"Welcome to Mars," said Will to a fortish European couple as they stepped out.

"Thank you, Dr. Chief Minister." The man shifted his large suitcase to his left hand and offered his right. "John Aylmer, geologist."

"Pleased to meet you, Dr. Aylmer. I hope Mars proves to be a happy place for you to settle."

"I think so; we're delighted to be here. We are a bit surprised it took five sols to reach the surface, though."

"New procedures," replied Will. "We're not sure how much longer we'll have access to spare parts on Earth, so we're stretching out the shuttles' service lives. That involves procedures such as carefully cleaning the engines between flights."

"Sounds expensive," commented the woman, offering her hand. "Dr. Christina Andropoulos, former chief scientist on Mercury."

"Pleased to meet you, Dr. Andropoulos, and welcome to Mars."

"Thank you. I hope we get a chance to talk in the next week or so; even though we're supposed to be keeping all our seniority, it appears we're being stripped of it."

"Your previous seniority doesn't kick in until your second year here." Will shrugged. "We need flexibility, especially in these difficult sols."

"We'd like a bit more respect; we're scheduled to do lab work!" she replied.

"The first year is difficult," agreed Will. He began to turn to the next arrival, but she reached out to his hand.

“But Dr. Chief Minister, this is ridiculous. I’ve been in charge of all science on Mercury for years.”

“And we’re grateful for your service; as soon as everyone gets to know each other, we’ll figure out what position is suitable,” replied Will, and he deliberately turned to the next arrival, causing Andropoulos to hurry off in a huff. He was surprised that in a situation like this, someone would pressure him or talk back; he was greeting people, not negotiating.

Liz and Mike came off last. Now 26, in the last two years Liz’s face had matured. There was something about Liz’s walk, too; she looked more confident. Mike, now 27, had gained a bit of weight, but his face stilled looked boyish and he still had his constant smile.

“There you are,” said Will, and he reached out to hug Liz.

“Dad.”

“Welcome home.” She dropped her suitcase and they embraced. He had tears in his eyes when they separated. Then Liz turned to her mother, who had already started to cry, and Will turned to Mike. “Welcome back.” He embraced his son in law as well.

“Thanks, Will.” They hugged as well and even Mike wasn’t dry-eyed. “It’s a great relief to be back on Mars.”

“We couldn’t wait to see you,” adding Ethel, and she embraced Mike as well. “Thank God you made it safe and sound. We were worried.”

“No need to; it was a routine trip,” added Mike. “Aerobraking at a high velocity is pretty rough, but the ballutes and strakes did a great job.”

“Here, let me take your suitcase,” Will said to Liz.

“No, I can carry it.”

“Well, so can I.” He took it.

“Oh dad!”

“Let me help.”

“You’re always helping.”

“I suppose I am.”

The four of them headed across the hall to South Main Tunnel. “You’ll like the flat we’ve made out of your and Marshall’s bedrooms,” commented Ethel. “It’s comfortable and private.”

“Until we get our own place, assuming we can get a mortgage again,” said Mike.

“Credit’s tight because of the disruption of our economy, but you can get a mortgage,” said Will. “Getting furniture is harder because production has dropped.”

“What are people doing?” asked Mike.

“Making cryogenic storage tanks, doing extra maintenance on all vehicles, taking repair courses, building equipment that will let us make things we can’t make now, designing facilities to obtain elements we’ve been importing from Earth—like arsenic, gallium, fluorine, and lithium—increasing gold production, making stuff for export to Callisto and Saturn. . . we’re extremely busy.”

“Can we really be self-sufficient?” asked Mike, surprised.

“If we have to be,” replied Will. “I hope it isn’t necessary. Imports are about to drop sharply for at least three years. We’re focusing on big, important improvements in self sufficiency, like life support equipment and fuel cells, which will permanently

decrease imports and increase exports. We've even got experts in rocket engine manufacture coming next year."

"Rocket engines? We can make them? But what about nuclear reactors?"

"Between the American and Chinese personnel and our own people Mars has almost 250 nuclear professionals, and we've already been making three quarters of the reactor parts. Uranium enrichment has been cut way back to free up engineers to tackle the problems involved in making the other quarter, or making usable substitutes. We've got a team working on the manufacture of turbines, both the kind needed by our jetwings and the kind for power generation; they're a major import. We're also working on a simple design for a Sterling engine."

"That's amazing. So we're not talking about wooden space vehicles and rubber spacesuits."

"No, not at all."

"The question really isn't self sufficiency, in a way," added Ethel. "We have 7,500 people. Five hundred couldn't survive here indefinitely; a thousand probably couldn't; but we have a critical mass of people and machines. The bigger issue is whether our lifestyle and culture will survive, or whether living will take all our energy and leave nothing for anything else, like science or exploration or art."

"Or developing ourselves," added Will. "We don't live eighty or so years in this world to accumulate toys or entertain ourselves; we're here to develop our virtues."

"Even that's difficult if you're starving," noted Ethel.

"Is everyone up here getting religion?" asked Mike. "I keep reading stories about people joining churches!"

“Joining is popular; the Bahá'í community has grown a lot in the last six months,” replied Ethel. “But there are a lot of confirmed atheists and agnostics, so don’t worry, you won’t be alone.”

“Oh, I’m not worried about that,” replied Mike. “In fact, I’ve been thinking of becoming a Bahá'í.”

Liz stopped walking and turned to face her husband. “You have? After all these years of asking critical questions?”

He was a bit put off by her response. “Yes. I agree with the bulk of the Bahá'í teachings, and the ban on drinking alcohol no longer bothers me because I’ve settled down. I’m not so sure that I believe, or that I’m ready to fast. . .”

“Try the fast out,” replied Ethel. “But you can’t be a Bahá'í unless you believe, so take your time with that.”

“How’s work on your dissertation?” asked Will, changing subjects, as he turned off the South Tunnel and into a side tunnel leading to Andalus.

“Coming along pretty well. I got some supercomputer time at MIT during the flight, in spite of the disruptions, and I’ll be getting some here once I show up in the lab. So far they’re confirming my thesis about the evolution of Mercury’s magnetic field, which helps explain the evolution of the Martian field as well.”

“Useful.” The pressure door in front of Will opened and they entered the bright light of Andalus Dome. Liz blinked a bit, then exclaimed “A real sky! That’s one thing I hated about Concord Station; a fake sky overhead!”

“Even if it’s a little pink, it’s better than a blue curtain!” agreed Mike. Both of them walked a bit faster, heading down the alley to the square itself where they were in a

sixty by eighty meter open space. The sun was high in the east and shining in strongly. “The sky is almost blue!” said Liz. “I guess it’s not dust storm season.”

“And there’s a blue filter in place right below the dome,” said Ethel. “I hate to disappoint you! We added it about a year ago, partly to make the sky look better and partly to cut down on the glare!”

Liz and Mike laughed. “It does make the sky look better,” admitted Mike.

They resumed walking across the square. “This afternoon I want to walk around in Baltic South,” said Liz. “I want to climb up the side of Layercake Mesa to the top and see the growing forest, then I want to take the balcony walk above Serengeti and see the lions.”

“That’s a plan,” said Will. “They’re both good walks to make.”

“Maybe tomorrow I’ll go to the geophysics department,” said Mike. “I want to make sure I get some research assignments, and not just repair and construction.”

“You should be alright because you have Marsian seniority,” said Will. “But we’re asking everyone to take a course in something mechanical or engineering related; we have several e-learning arrangements with terrestrial schools. There’s a list of skills we want to strengthen or establish. Moses Waigwa’s Ministry of Transportation is in charge because he has a lot of unemployed road builders and they are excellent mechanics.” They stopped a moment for the pressure door leading to their house to open. They entered, walked down the tunnel a few meters, and entered Will and Ethel’s house.

“Come see,” said Ethel. She led the way down the hall leading to the kitchen, which now had a new door in it leading to the newly refurbished flat. They entered a private living room; the bedroom was beyond, with a bathroom between the two rooms.

"This is nice!" said Liz. "It's about as big as our place in Concord!"

"It'll be very comfortable," agreed Mike. He looked at the sofa. "This looks like ours before we left."

"It is; we gave it to Marshall, remember?" said Liz, tapping him.

Mike laughed, "Oh, that's right!"

The atrium of the *Korolev* was crowded with all 150 members of the crew for the crossing of Jupiter's orbit. Huge wall screens carried a fantastic live image of the King of the Planets and its swirling pastel storms from a satellite orbiting Jove, which was over a billion kilometers away on the other side of its orbit around the sun. The crew was gathered in groups around the dining tables, staring at the nearest screen, chatting in subdued fashion.

"How will they get the welcomes from Callisto here at the right time?" asked Thad Lind, Johnny's fourteen year old son.

"Careful timing," replied Johnny.

"It's a bad time for a solar storm," added Guanya. The storm had hit an hour earlier.

"Thank God for two thousand tonnes of stuff around us," said Marshall. The Atrium was the most radiation shielded part of the ship. The *von Braun's* atrium was a mere twenty-five meters away and the two ships were shielding each other. Guangya looked at Soo, who was eight months pregnant and sitting uncomfortably next to him, a heavy radiation blanket wrapped around her. He moved closer to give their unborn baby a

bit more protection. Marshall saw Guangya's reaction and responded the same way with Liz.

One of the wall screens flickered and changed images. Charles Vickers, Commander of the Jovian Commission facility, and Tang Enlai, Commander of the Chinese facility, appeared seated in chairs side by side. "Greetings from Callisto to our Saturn colleagues," began Charles. "If our timing is right, you have just passed the orbit of Jupiter and have become the humans to have traveled the farthest from our home world."

"The Jovian system, and Callisto itself, are at peace," continued Enlai. "This system and its twin outposts have ninety human beings; thirty are Chinese, thirty are American, and thirty are from other nations, principally Europe and Latin America, the chief sponsors of the Grand Union. Sixty of us have lived on Mars and fifty of us are dual citizens of that nation and our birth country. We are committed to peaceful, joint exploration and development of this system for the benefit of humanity. Some day, Callisto will follow Mars down the path to nationhood, as will Titan, so we greet you as one future nation to another, confident that the current troubles on Earth will represent a temporary delay in humanity's expansion into space."

"Have a safe journey to Saturn," concluded Charles. "Godspeed to you."

The transmission ended and the screen went blank. The atrium erupted in spontaneous applause in response. "Wow, that was something!" said Guangya.

"Vision," said Johnny. "Looks like they've got it. And they have peace, in spite of the fractured command structure and the Sino-American rivalries."

"Charles and Enlai are men of great capability and integrity," replied Marshall.

The screen flickered again and Yuri Severin's face appeared. "Greetings from the 320 people on board the *Von Braun* and *Korolev*," he replied. "We are now twelve months into our trip to the Saturn system. We face the singular challenge of establishing a settlement on a world with a denser atmosphere than Earth, an atmosphere that conveys a ubiquitous deadly cold. We are heading toward a system with scores of worlds to explore, many of which are utterly unique. We will probably discover yet another ecosystem and explore new geological systems.

"We make this journey with great confidence and excitement. Our equipment is excellent, our training has been superb, and our human resources are unrivaled. Our future outpost site will provide almost all the natural resources we will need. We, too, do not fear for lack of support, for we are designed to complete our nominal mission with existing equipment. Even if we are forced to return sunward, we can be sure that humans will return to the Saturnian system and will indeed build a nation there in a future century. We greet our fellow residents of the outer solar system and anticipate that there will be future colleagues around Uranus and Neptune as well. Farewell."

The atrium erupted into applause again "That was good," commented Marshall.

"He may be taciturn, but he can be eloquent," said Guangya.

Marshall turned to Amy. "Let's call mom and dad."

"Okay. And share the news with them?"

"I think so, this is a good time."

She nodded and rose from the table. They walked across the curved floor to another table nearby under two lemon trees where they had a bit of privacy. They

huddled together so the attaché's camera would pick up both of them Marshall pushed a few buttons to start the recording.

"Hi mom and dad," he began. "I don't know whether you're watching this live, but we just passed the orbit of Jupiter. In about half a day we'll pass the orbit of Callisto and become the farthest human beings from Earth. Yuri just exchanged video greetings with Enlai and Charles; maybe we outer-solar-system-people will become great at making speeches.

"It was quite exciting. Our eyes are now on Saturn and Titan a billion kilometers ahead of us. It's incredible to think that's how far we still have to go. We can't wait to get there. We won't be bored; every day we get closer and the time delay for running equipment gets less. I've been very busy running several prospectors. The dissertation is coming along pretty well; I just finished chapter five. And then Amy and I have something else to keep us busy, too." He looked at her with a smile. "We're going to have a baby in October. We've been wanting to tell you for a while, but the first few months are uncertain and we didn't want to disappoint you. But the first trimester's almost over now and Amy's feeling better every day. She's healthy and strong, and so far the baby seems to be as well. He or she will be the third child born in trans-jovian space. Considering we have 190 adults under age 35 on board who are childless, we can probably expect a lot more kids in the next few years. I guess it's a measure of how confident we feel, in spite of the mess on earth. Titan's going to be a settlement and eventually a nation, and we're going there fully aware of that fact."

13

Razor

late April 2069

Dawn sunlight diffused down the skylight and into Will and Ethel's bedroom. He looked up from his desk where he had been reading the *New York Times;* the sun was now up. He loved it when he actually knew what was happening outside. He also knew the time without looking at a chronometer; 7:20 a.m., which was the average time of sunrise at Aurorae, especially when Mars was neither at perihelion nor aphelion, as was the case just after the southern spring equinox.

He rose from his desk and headed for the bathroom. Ethel was still inside, but through the open door he could see she was out of the shower and mostly dried off. He rubbed her back. "Well, they're forecasting a reasonably normal planting season in Earth's northern hemisphere, so food won't be short."

"Thank God. Is that the only news this sol?"

"The Senate starts its impeachment trial in two sols, but I'm not bothering to read all the stories; I'll wait until the trial starts and hear the details then. Jacaranda will keep me informed." He pulled off his night shirt and threw it out of the bathroom onto his side of the bed, then stepped back in. Ethel was done drying herself and moved over so he could brush his teeth.

"I've got to get ready for a 10 a.m. teleconference," Ethel said, and he nodded periodically since he had a toothbrush in his mouth. "Then I've got two meetings about terrestrial exports. There's a report about last month's platinum theft; the Kazakh police finally think they have a lead. It was an inside job."

“Only way they could have grabbed twenty tonnes of PGMs before the ground crew,” Will muttered in and around the toothbrush.

“Thank God most of the PGMs were Muller Mining’s and not Mars Metals’. Then this afternoon I’ll tackle a dozen or twenty emails and videomails. Henry Smith wants to ask me about the proposed stock market.”

“Essential,” muttered Will.

“I know. It’ll be a busy day.”

Will rinsed out his mouth. “As usual. At least we have peace and power.”

“Yes, and can export. It’s a shame we can’t import!”

“We’re getting there.” Will picked up his electric razor and flipped the switch. Nothing happened. “What’s this?” He flipped it again.

“It’s dead,” she observed.

“Just what I need. I wonder whether I can buy a replacement?”

“I doubt it, but it’s worth a try. You should be able to get it fixed.”

“Fixed? No one fixes electric razors on Earth.”

“Well, they have to be fixed here.”

“I guess. I’ll go ask Mike whether I can borrow his razor.” Will stepped out of the bathroom, pulled on his shirt, and walked out of the bedroom and across the family room to the door leading to Liz and Mike’s private flat. He hesitated to knock, but he did anyway.

“Who’s there?” It was Mike’s voice.

“It’s Will. Can I borrow your electric razor for a moment? Mine just died.”

“What a pain. Just a sec.” A moment later Mike opened the door slightly and stuck his hand out with the razor, since apparently he was wearing little or nothing.

“Thanks, I’ll leave it on the floor here in about a minute.” Will hurried back to his bedroom and shaved quickly, then returned the razor and jumped in the shower. In a half hour he was dressed and ready to go. He grabbed his attaché and medora and headed for the Gallerie to get a yoghurt and a pastry, as usual. But before getting in line for his breakfast he headed for the Deseret/Walmart. “Do you have electric razors?” he said to the smiling young woman’s face on the screen of the store’s virtual assistant at the customer information desk, just inside the front door.

There was only the slightest of pauses. “We’re sorry, but we’ve been out of electric shavers for five months.”

“Do you have any coming?”

“We have a shipment coming in two months, but they’re all reserved. Would you like to get your name on the waiting list? We don’t know when we will receive additional stock.”

“Yes, the name is William Stephen Elliott.” He pronounced it carefully for the software.

“Thank you, Chief Minister Will. Would you like me to check the inventories at Silvio’s El Corte Inglès and at Radio Shack?”

“Yes please. Can you check Everything Used as well?”

A pause. “I’m sorry, neither Silvio’s nor Radio Shack has any electric shavers in stock. No, Everything Used’s inventory is not accessible to us. You’ll have to inquire personally.”

“Thank you. Can you access the official repair database? Is anyone repairing electric shavers?”

“No, I’m sorry, the official database has no one volunteered or assigned for that item.”

“Thank you.” Will turned and walked out of the store, disappointed.

He walked past Radio Shack, which was open for business but was still unattended by a human. He stopped at Everything Used because the owner, Tonye Kamunokuru, was sitting at her repair table, which was situated amidst tables and shelves of used stuff. “Good sol. Tonye. Do you have any electric shavers?” He held up his broken one.

“I think I have two or three, but they’re broken as well. I get a used one every month or two and it’s sold in a matter of a few sols.”

“No one has any.”

“It’s funny what we run out of. I have ten functioning robotic vacuum cleaners for sale! I can put your name on my purchase list.”

“Yes, please. How much?”

“They go for about two thousand.”

“Wow; new ones are a thousand.”

“Yes, but there’s a shortage.”

“You don’t fix them?”

“I’m sorry, I don’t; they’re too small and can take a huge amount of repair time. Check with Transportation.”

“That’s my next step.” He looked around. “How’s business?”

She nodded. “Alright. Perhaps the term is ‘modest.’ It’s better than Silvio’s and Deseret, for sure, but the sol after equinox I had a line of people out the door wanting to sell used items to me. I ended up buying almost as much as I sold!”

“Still, all this stock is pure gold.”

“When we reestablish contact with Earth it’ll be junk again. It’s a gamble. Rev. Tuesday asked my why my tithe was down in April and when I told him, he said ‘no, sell the stuff!’” She laughed.

Will chuckled as well. “Thanks, Tonye. I’ll let you know how much the repair is.”

“Thanks, Will. You know, you could grow a beard.”

He shook his head. “No, I grew a beard once and it was rather scraggly.”

“That’s because you have African blood.” She said it with pride. “But African men have grown beards for thousands of years that didn’t look like European beards, and they were fine.”

“That’s true; I shouldn’t have said it so Eurocentrically. So let me put it this way; I don’t want to grow a beard!”

She laughed. “I understand. Have a good sol.”

“Thanks, Tonye. Ciao.”

He stepped out of Everything Used and back into the Gallerie, where he bought his usual breakfast and contemplated all the shavers purchased and squirreled away, perhaps for a son’s thirteenth birthday in three years. Items normally wouldn’t have run out yet, but people were hoarding up. He had stocked up on a few things himself.

As he was walking out of the Gallerie, he saw Father Greg enter with four children in tow: his children John, 18, and Esther, 16, and the sons of his close friends

John Hunter and Vanessa Smith, Maaka, 18, and Wicahpi-luta, 14. John and Maaka were both high school seniors and close friends; Maaka and Wicahpi-Luta were staying with the Harris family temporarily.

"Good sol to all of you," said Will. He turned to Maaka. "How are your parents?"

"Great; we talked to them last night. They're coming back here just before dust storm season."

"Elysium always has to reduce staff then," agreed Will. "I'm sure you guys will be glad to see them."

"That's for sure!"

"And how's school?"

Maaka nodded. "Good. I'm mostly taking advanced placement courses."

"Excellent."

"Say, Will," said Greg. "We had the Manning family over for supper last night. Sean and Vera talked to Anna and me a very, very long time about this place, and their two boys talked with the four kids. I think they're just about ready to make a decision."

"Oh, good." Will looked at John and Maaka. "I hear you guys have been friends with Jonathan and Carl."

"Yeah, they're good guys," replied Maaka. "I think they want to stay here."

"Carl definitely does; he's gotten interested in Martian paleo-oceanography," added John.

"Good," said Will. "Thanks for letting me know, Greg. Sean said he'd get in touch with me at some point, so I suppose I'll hear from him."

"I'm glad. Have a good sol."

“Same to you. Ciao.”

They parted company and Will stepped into the bright sunlight of Andalus Square for the walk to the Commonwealth Building. Once in his office he set up his hutch with coffee and tea water, then turned to his videophone and called the Ministry of Transportation, since they had taken on all sorts of repair tasks.

“Good morning, Transportation, this is Myint-San.” The face of a young Burmese woman appeared on the screen. Like most Burmese, she had no surname.

“Good sol, Myint-San. My electric shaver just broke this morning and I can’t buy another one anywhere. No one has taken on the responsibility to repair them, either.”

“Then I guess it falls on us. Can you bring it down?”

“Sure, but I’d rather send it down. I need it fixed and I don’t have an alternative. What sort of price range are we talking about?”

“Labor’s two hundred redbacks per hour. If they have to take it apart, clean it, and make one or more new parts, it could cost three thousand redbacks.”

“Wow! That’s triple the cost of a new one. Don’t you use a repairbot?”

“They’re not programmed for shavers. They can take it apart and clean it, though; that’ll save some time.”

“Wow.”

“I can assure you that a through cleaning of small devices like shavers usually gives them a new lease on life.”

“Okay, I’ll send it down with a note to give me an estimate before completing the repair. How long will it take?”

“Probably three or four sols.”

"Thanks, that's what I'll do, then. Ciao." Will closed the videophone link, put the shaver and note in a transparent plastic bag, sealed it, and dictated a note describing what had gone wrong into the bag's electronic chip. It went in his outbox.

He turned to the news summary. It was now late April and the weather on Earth was turning warm; it brought many benefits, such as people getting out of their houses more, but it also meant more crime. It reminded him of yestersol's videomail from his sister; only one tree was left on her one-acre lot, but they had stayed reasonably warm all winter and had managed to eat reasonably well. Unfortunately, unemployment in the U.S. stood at twenty-two percent and it was unlikely to go down any time soon. Once a global depression was established, it was hard to reverse; economic activity, down thirty percent in the last eight months, was still declining. It was unlikely to bottom out for two or three years and would take at least a decade to recover if civil peace could be maintained, which it wasn't in many countries. That meant unemployment, social security, and national medical insurance would remain in a state of collapse. Gold was staying above a floor of $62,000 or 3,000 redbacks per ounce; at that rate, 500 tonnes of Martian gold per year was worth 50 billion redbacks. But the U.S. dollar was worth about a twentieth of what it had been at the turn of the twenty-first century. The Commonwealth government and the various mining companies were buying up real estate and other assets in the hope they could preserve the surplus for later use; property was cheap. But what would come out of the crisis at the other end was impossible to predict. Even Marsian life would not be the same, as the broken shaver reminded him.

He turned to an email from Marshall assuring him that the air leak—which he had not heard about—was not dangerous and that they were fine. He had to do a web search

to find out about a slow leak on the *Korolev* that hadn't yet been located and was causing them to lose two percent of their air per year. Considering they'd be at Saturn in a year, it was not serious even if the source was never found, and it would be.

Huma knocked on the door. "Sean Manning just called and asked for an appointment this sol. You've got meetings later in the morning and afternoon, so I told him he could come right over."

"Good. What's my schedule?"

"Meeting with Andries, Yevgeny, and Emily 10:30 to noon to discuss the needs of Saturn, Ceres, Callisto, Mercury, and Venus and how to meet them locally."

Will groaned. "That's a long one. None of them are satisfied with the substitutes we can make."

"We'll just have to tell them to take it or leave it," replied Huma. "Who do they think we are; Earth? Then this afternoon you have a running 'live' meeting with Pete Theodoulos and the diplomatic team on Earth. Lots of 'dead' time for videomails, but no big blocks of time for meetings."

"Do we have their agenda items yet?"

"Yes. There's a report about spending four billion redbacks over four years building fifteen embassies; Pete wants to build an empire of big buildings for us. There's an update on the diplomatic strategy and a recommendation we get more aggressive in calling for international mechanisms to regulate economic activity. And there are country-by-country updates about Brazil, Canada, China, the European Union, France, the Grand Union, Japan, Korea, Malaysia, and the U.S."

“That’ll use up the afternoon. Get the embassy-building report to Yuki, so she can hit the roof about it and I’ll have ammunition to use in scaling it back. The old Mars Commission had the same problem with buildings scattered around the Earth. Do we have a report from Emily about expanding terrestrial support services?”

“Yes, I’m about to send it to Pete. Moses has a huge list of repair and replacement procedures we can contract out, and fifty universities are begging for them.”

“Good; we can use all the help we can get.”

“It’s too bad they can’t actually *do* the repairs.”

“Repair procedures for everything will help; make sure they have electric shavers on the list, mine broke this morning!”

She laughed. “I’ll check.”

Will frowned. “What did you do to your hair?”

“Oh; don’t look. I’m having a bad hair sol.”

“No, it looks okay.”

“Omar hated it but didn’t dare say anything. I could tell.” She turned to look behind her. “Manning’s here.” She stepped out of the doorway and Will rose from behind the desk.

“Sean, come in,” he said as Manning stepped into the doorway. He walked to the door and they shook hands. “Come sit. Tea or coffee?”

“Black coffee.” He sat at the table and watched Will bustle about, preparing a coffee and a tea. “Ah, your famous hospitality.”

“It’s the Marsian way.”

“I am impressed by all the hospitality I’ve received in the last five months.”

"I'm sorry Ethel and I only invited you and your family over twice. But I gather Father Greg has invited you, and Roger and Madhu. . ."

"Yes, quite a few people. They were kind. Now we have to reciprocate."

Will handed him a cup of black coffee and sat across the table from him. Sean looked around the office and out the window at Andalus Square. "Well, we've decided to stay."

"Oh? What were the factors?"

"A lot of practical reasons. The boys want to stay and purse their university here, and that may be more practical than trying to get into a university on Earth. The seven-month flight back in a caravel won't be good for them either; that's a lot of radiation exposure. Vera's willing to stay and she may apply for a job in Martech's new library; she's one of the few people up here with a library science degree. And I don't know what sort of job I could get. My brother's vice president of a big university in Illinois. He says they've laid off half the support staff, ten percent of the faculty, and everyone else is getting two thirds of a paycheck."

"And no one's paying their mortgage, so the banks are collapsed," agreed Will. "It's definitely a bad time to go back. But if you went back you might be able to work for us. We've got 150 going back in late June, for various reasons—worry about relatives being the big reason—and we want to hire all of them. They know our equipment and raw materials, so they can advise the groups we're hiring to look at self sufficiency issues."

Sean considered that possibility a moment. "I doubt that would appeal to me, consider that mechanical subjects like repairing broken objects are not my strength."

"I would have no objection if you were re-appointed ambassador."

"Really?"

"You were loyal to your government and followed orders. When you surrendered you really had no options left; they can't blame you."

"Well, they did and fired me, but the existing government probably hasn't much time left. Who knows what the replacement government will do."

"I am still amazed that the Vice President and Secretary of State were added to the order of impeachment at the last minute," exclaimed Will. "It really raises the stakes and makes the impeachment harder to complete, but if the Senate impeaches them it cleans house."

"I think it was part of a deal reached behind the scenes to kill the impeachment, but it may have backfired. The Knight administration's approval rating has fallen below twenty percent; lower than any in history. The damage they did to the country and its reputation is unprecedented. More Americans have died in this conflict than died in all wars combined. The economic damage far exceeds the Great Depression because of the integrated nature of the economies, and it may take longer to recover. Some countries have collapsed into chaos as a result. All winter the Administration made excuses, but more and more of the American public saw through them; the end of martial law is unavoidable now and with it the public's support will be gone."

"I'm concerned that we establish relations with the government, old or new. Right now the Administration refuses to deal with us; we have to send issues to them via the Australian ambassador. The U.S. embassy here remains closed and no other embassy has been asked to take over its duties. We have not entered it and have told the former staff of

two to continue to maintain the building. We've even put them on our payroll because their pay checks stopped coming. Perhaps you can help us with the embassy."

"I can go in, inspect, and make a report. But even if I'm not reappointed ambassador, there are some things I'd like to do. As you may know, I've been invited to join the Ethics Forum at Martech's Center for Humane Living and lately we've been tackling some very complex issues, such as forgiveness of enemies. We plan to turn to the ethics of democracy next month. These forums are being broadcast on Earth and are developing a following. I want to propose that the Marsian approach to elections be tried in the United States. It would have to start out at the city or county level, though it is not impossible that it could be tried at the state level. The vicious partisanship that has dominated American politics for half a century has exhausted itself and people are ready to try something else. I'm not sure I can advocate some of these changes as American ambassador, but as a former ambassador I could."

"That's interesting because Enlai Tan has a similar interest for the Chinese system. He's Commander of the Chinese outpost on Callisto, but he may not stay; we were exchanging videomails last week."

"There are a lot of people at Martech who want to advocate changes on Earth. Frankly, I think your administration needs to fund the Center for Humane Living's efforts more because they are more scholarly and neutral than Marsian government efforts. This crisis has made a lot of people rethink basic assumptions. The world economy collapsed like a bunch of dominos because no one was managing it. Everyone takes for granted that national economies have to be managed, but they don't want the world economy to be

managed by ‘someone else.’ The Grand Union almost came unraveled because it was too weak. Now plans are underway to strengthen it to prevent a repeat of this disaster.”

“And both the U.S. and China will have to join.”

“Exactly. That’s the lesson a lot of America-firsters have started to learn. The Grand Union will have to set up trade barriers against outsiders to prevent them from destabilizing the economies within the Union. So there will be economic penalties against non-members. Mars will have to join eventually in some form. There will be no other way to end the depression short of dictatorship in parts of the world followed by a world war.”

“But it will take a long time.”

Sean nodded. “Maybe the rest of the century, and things will get much worse before they get better. China’s tending toward totalitarianism and that’ll slow the process. But Mars is one of the keys, I think; it’s stable, multicultural, and above all it’s a *moral* society. It’s a refutation to Fundamentalists that their brand of religion is essential for morality to be established and it’s proof that certain basic moral principles are essential for a society to work successfully. It’s also a proof that moral leadership is the key to improving democracy. Mars is the only governing system to achieve this breakthrough.”

“I completely agree,” said Will emphatically. “You’ve put it well. It’s the principle reason we have to grow; we’re still too small to be an effective example.”

“I’m not so sure; your influence is far more than your size would suggest. In a way, a large population may doom the Marsian experiment.”

“If that’s the case, we’re no example to Earth! We can preserve our system of governance and grow in size. We *have* to.”

“I agree, but I’m not convinced it’s possible.”

“It’s a question of cultural values. For example, in 1797, when George Washington completed his second term as President, there was a rumor that he’d call out the army to prevent John Adams from assuming the presidency. No country had ever had a peaceful succession of elected leaders before. But it proved to be possible and the American example has changed the world. It is possible to elect leaders without campaigning and other corrupting practices, but maybe Mars will have to demonstrate it repeatedly, as it gets bigger and bigger, for humanity to learn the example. And no doubt we’ll have our lapses, too.”

“Yes, I suppose Mars will. If you hadn’t championed this form of government, Will, it never would have happened up here.”

“I’m not so sure. It’s no secret that we’ve partially copied the Bahá'í model of elections, but I’m not the only Bahá'í here. This coming weekend delegates from all across Mars will gather to elect the National Spiritual Assembly of the Bahá'ís of Mars. The delegates were elected by the local Bahá'ís after prayer without nominations and campaigning. The nine-member National Assembly will be elected the same way. This weekend, however, in spite of all the troubles, similar national conventions will occur in every major nation on Earth to elect Bahá'í National Spiritual Assemblies in all those countries. Those conventions have followed the same procedures of no nominations and no campaigning for over a century. In some countries the Bahá'ís were electing their local and national spiritual assemblies this way before the country even had free elections for its government. So the Bahá'ís have an enormous amount of experience. And now they are growing in size again; the Bahá'í membership tend to grow in fits and starts, and

whenever there is a major social crisis it grows. There are a dozen small countries around the Earth that are more than ten percent Bahá'í. I think those countries will be looking at the so-call 'Marsian' model of governance pretty soon, Martech Ethics Forum or not."

Manning was startled by that. "You may be right. But Will, what Mars has achieved—what we have achieved—is to take this religious model and make it work in a secular society. And we have you to thank for that."

Will shrugged modestly. "Perhaps."

Manning glanced at his watch. "I've taken too much of your time. I hope we can talk every month or two about matters like these because it helps me focus my thoughts."

"Definitely, I enjoy our conversations."

Manning rose. "Thanks, Will, for everything." He extended his hand.

"Thank you." They shook. Then Manning headed for the door. Just outside the doorway he saw Will's outbox and the transparent package in it. "An electric razor?"

"Yes, it broke this morning. I'm shipping it off to the Transportation Department to get it fixed."

"We have an extra, if you'd like it."

Will's eyes lit up. "Really? You can't buy them anywhere."

"Yes, I bought an extra one in September. I figured with two boys and myself, we'd need a spare. But so far we haven't used it."

"I'm getting this one fixed, so that's alright."

"It's my gift to you, Will. I'll drop it off later this sol. Ciao."

14

Aram

June 2069

Will walked to his hutch to get another cup of tea and prepare himself mentally for the next videomail. It was a tricky one. He hit reply.

"G'day Randolph," he began. "I feel inspired to use 'G'day' because 'good sol' is the Marsian translation of that venerable Australian expression. Laura Stillwell says I was the first person to use 'good sol' on Mars, and when I used it 'g'day' was my model.

"But I didn't call about that. Robinson Space is in a very difficult position and I understand that. But so is Woomera Lift Services and a lot of other launching companies. Mars is totally dependent on all of you to get our people and goods into orbit. And our dependence won't end in late October when the current launch window to Mars closes. If we can get cargo into low earth orbit in November or December, so be it. Ideally, we want to import two thousand tonnes of stuff in the next eighteen months. We're going to run out of a lot of things up here and we want to get replacements.

"But right now no one can lift practically anything for us because of the lack of spare parts. Your two shuttles won't get spares for several months at least. Woomera's shuttle is in good shape except for one or two parts. Your shuttles already can't fly. If you won't loan parts, why not sell them? Even selling them for double the purchase price would not be unreasonable right now; after all, manufacturing of just about everything is uncertain because of export restrictions. When half the goods on Earth require parts made in four different countries assembled in two other countries, export restrictions cause a collapse of commerce pretty fast!

"An unusual request for profit is legitimate. It's far more legitimate than holding out and refusing to collaborate at all. It's June 3. Opposition is six months away. We want to get as many as 1,200 personnel into orbit in five months. Time is of the essence for us. If Robinson Space can't help us now, why should we help out Robinson Space later? Please take seriously this plea from a steady customer for help in the short term, because we aren't going away in the long term. Thanks, Randolph. Bye." Will sent the message with a combination of resignation and relief. Things were getting desperate when the Chief Minister himself was pressed into service to locate spare parts for the three Swift shuttles they had access to. So far, three months of lifting had taken only 300 migrants to orbit.

He turned to his next task: a videomail from Pete Theodoulos. "Good day, Will. We just got a fascinating report from the British Embassy in Washington. Yesterday one of their high-level officials had lunch with Bartolomeo Mennea, the new Speaker of the House, the man who could become President of the United States if this impeachment fight ever ends. They were meeting with him to get some sense of what sort of fellow he is, since he's been Speaker only a month and hasn't defined himself yet. He's 68 years old and has been in the House twenty years after serving as a mid-level business executive; he's one of those Yale Business School types. They were quite pleased with the meeting. He's well informed about economics and has ideas about how to pull the U.S. out of the depression. He emphasized international economic reintegration and when they pointed out that the Grand Union probably wouldn't let the U.S. back in unconditionally he admitted that the United States had a lot of work to do. He also mentioned space policy; 'the need to reestablish international cooperation in space and

specifically on Mars.' That sounds very positive. Of course, we still don't know whether he'll become President; the impeachers never should have tried to impeach three officials at once. Mennea would also be a weak President since he wasn't elected. His personal views may not be very relevant anyway. But it's a bit of encouraging news. Ciao."

Pete's image faded from the screen. *Bartolomeo Mennea.* Will rolled the name on his tongue. It sounded familiar, but perhaps the familiarity was due to the man's age: Will was 68 as well. He hit reply. "Thanks, Pete. I wish we could get a bit more about his space policy. It's a shame it's still impossible for you to go to D.C., so make some calls. Who does he know? Who would he appoint? What NASA stalwarts are likely to emerge as policy makers? Find out what you can. Ciao."

That was encouraging. Because of the turmoil of a three-month impeachment fight, the United States still had no diplomatic relations with Mars, still banned Marsian diplomats, still banned its citizens from going to Mars, and still had an embargo in place, including on shuttle spare parts made in the United States. The Japanese firm launching for them from Okinawa was smuggling parts from the U.S. to keep their shuttle going.

Will's videophone rang with a local call. He glanced at the caller identification; it was Lisa Kok. He opened the line and said "Good sol, Lisa."

"Hey, Will. Say, do I *have* to go to Aram with you next weekend? I just did a virtual reality tour of their facilities. Very big, very pretty. Their version of Eden on Mars; an expanding oasis in the desert. But it's hardly a scientific model for us."

"Are they claiming it's a model?"

"One item on the agenda is what we can learn from their ecology. I can see their entire sensor array here if they give me permission to do so. The folks down in Mars

Control told me they check the inputs periodically and that Aram has very limited sensor data. I really don't want a bunch of New Age nature mystics lecture me about how to run domes when they don't even have the data to back up their claims, especially when I have to spend a sol to get there, a sol to get back, and I'm stuck there for two sols."

"So, you'd rather send me in as a sacrificial lamb?"

"You have the patience of Job under those circumstances! I don't. I want to call them a bunch of unscientific idiots and end the conversation."

"That's what I often want to do as well; but as you said, I don't." He considered. "Well, what can I say? I suppose I can drag along a couple of staffers. But I'll press them to send us real documentation and ask them to give you access to their sensor data. You have to promise to read the documents!"

She laughed. "I can do that."

"So, when will I get another report about the cactars?"

"A few months; Jefferson's working on an update. We're getting bombarded with requests for research grants from impoverished biology departments on Earth and they'll work cheap, so we're working with Yuki about that."

"Good, this is a great time to farm out a lot of support research. I'm sorry the doming of Crater Lake has been postponed, but it's just not possible right now."

"I know, but we're looking into cheap ways to upgrade the reservoir cover so that it can hold in more pressure. If we can raise the interior pressure even modestly, Crater Lake can host a richer ecology. We can probably even use it as a major source of fish. But I'll get back to you about that. Thanks, Will. I'm relieved."

"Yeah, you're off the hook. Ciao."

“Ciao.” He closed the line and considered who could replace Lisa. Forest River was a long-winded prophet and his followers were devoted to his philosophy. It was a pain to get to Aram because jetwings didn’t fly there, though if he prevailed on the company they’d drop him off and pick him up. The 1,500 kilometer drive took twenty-four hours. He regretted agreeing to go at all, but he hadn’t visited the place in six years and had postponed his visit once before.

Then he had an idea. He punched in Ethel’s number.

“Yes, dear?” she replied.

“So, you complain that I never take you anywhere.”

“Well, you don’t. We haven’t been to Uzboi for a year; we don’t even get to the Dacha for the weekend. Its just work work work work. . .”

“You do a fair amount of that yourself.”

“Well, what else can I do; knit? Surely you aren’t proposing a getaway?”

“I am, but to an unusual destination: Aram.”

“Aram? I thought you were going on a business trip there with Lisa and an aide.”

“She can’t go; to be more specific, she doesn’t want to go. So here’s what I have in mind: just the two of us, a ranger and attached portahab, a long automated drive together, some good food, a few candles, that silk nightgown you’ve got. . .”

“And don’t forget your lovely silk bathrobe. This sounds interesting. Four sols?”

“One there, one back, and two amid the limpid pools and lush palms of Aram.”

“I suppose it would be pretty.”

“And you’re good at smiling when asked to observe strange neopagan fertility rituals involving water.”

She laughed. “I can handle that. We could even get in a hike or two; we haven’t done that for a long time. That’d make it worth while to sit through a few long-winded speeches, some by you.”

“We’ll drive right past the Primavera Fossil site; I could show you around.”

“I’ve been there before. Or have I? No, I guess it was a virtual reality visit fifteen or twenty years ago.”

“We’ll drive through some pretty spectacular canyons. The scenery from here to Aram’s some of the best.”

She smiled. “Okay, you’ve got a date.”

Will had to be in Aram Satursol morning, but rather than leaving Frisol morning, Will and Ethel headed out Thursol after sunset. They ate a romantic dinner together in the little cabin of the Portahab while the rover drove them along Meridiani Highway, without headlights, at 70 kilometers per hour.

They awoke an hour after sunrise as the vehicle was traveling through a narrow canyon in Hydraotes Chaos. Their bed was in a cabin that extended over the ranger. They opened the curtains so that they could survey the landscape. “I love this dramatic scenery,” said Ethel, her eyes feasting on the cliffs, the heaps of fallen boulders, and the rolling canyon floor, illuminated by slanting sunlight in a slight haze of dust.

“It’s so beautiful! And it’ll go on all day. The next thousand klicks is all chaosland. It’s amazing we could build an advanced highway through such crazy lands.” He gazed approvingly at the smooth, packed gravel surface. On each side of the road was a ditch, dug to obtain the gravel to raise the highway’s surface thirty centimeters above

the surrounding ground; enough for the wind to sweep it free of dust. Periodically the ditches had gaps where vehicles could pull off.

"It's an impressive piece of work. Now, get me some breakfast."

"Breakfast? Okay." Will climbed out of bed, went down the stairs, and busied himself in the galley corner. Ethel soon followed. "I'd rather help."

"You can set the table."

In a few minutes they sat in front of tea, pancakes, yoghurt, fruit salad, and sausages. "How nice," she said. "We get so little time together nowadays. And this time it's even an adventure!"

"It is. We'll be at Primavera about noontime. Four hours later we'll reach Tiu Overlook, which has a crater and a gully headwall nearby that haven't been explored. So if we have the energy we can have a *real* adventure and put our footsteps in a place where no one has walked."

"That'd be fun! We went on geology expeditions regularly our first four years here, but then Marshall came along and this place began to get big. We could even call up Martech's Field Support Center."

"We should put video cameras on our helmets, dictate descriptions of what we see, collect some samples, etc., so the whole exploration will be captured for future review. Besides, if we have trouble people will know. We'll have to walk about a kilometer from the ranger."

"Let's do it!" She smiled.

Will nodded and ate a bit of his pancake. "So, how are you?"

"Do you mean. . . existentially?"

"Yes. We're blessed with two very capable adult children and fascinating but demanding jobs, yet life is more."

"It is. Perhaps we should take a little time on this trip to pray together." She sighed. "We aren't getting younger, Will. Sixty-seven: I'm three years from retirement age. And in spite of our national crisis, maybe retirement isn't such a bad idea. It's a time to reflect as well as relax, and reflection is a rather important aspect of old age."

"It is, but reflection is important at every age, and something best done in association with other things. I don't want to dedicate a phase of my life to it. I'm coming up on the end of my first term, and I suppose I'll be elected to a second; right now no one is saying I shouldn't be, and *Mars This Sol* says I have a pretty good approval rating. But after that, I'll request to retire. Four annums is a logical term limit for the Chief Minister. As much as I'd like to continue, some one else should have the chance."

"What would you do?"

"Become a commentator on things, encourage change, be a guardian of our values. . . the sorts of things you can do when you have a reputation and are listened to, even if you have no authority. And I'd write."

"You should write your memoirs. I doubt I'll wait until you retire. I'll probably retire at 70 or 71. I enjoy running Mars Metals, but there are others who can do it, and Lord knows that we don't need the money."

Will chuckled. "Right now no one knows what they're worth, with Martian land and stock fluctuating in value every sol."

"Even so, we're worth over one hundred million. That's something else we need to thinking about: who we'll give our money to."

“Not until we use more of it.”

“Let’s draw it down; we don’t need so much. Everyone’s holding onto their investments right now because of uncertainty and that makes even less money available.”

“True. But our Mars Metals Stock is half or third of what it was worth because of the collapse of platinum prices; if we sell it now, we’ll suffer a huge permanent loss.”

“Then let’s donate the stock. The Bahá'ís need the income. There are many charities and peace groups that need help now.”

Will nodded. “When we get back let’s figure out what to donate to whom.”

They finished breakfast, then sat and watched the landscape roll by. They drank tea, talked, and contemplated the forces that had shaped such dramatic cliffs and boulder-heaped canyons back in the sols when Mars was young and vigorous. At noon they stopped at Primavera, which had been a large, slightly acidic lake thronging with life four billion years earlier. It was one of the few spots on Mars where there was something one could call coal; a high-carbon layer about a meter thick consisting of carbonized fossils, eolian dust, and iron-sulfate salts. They hacked at the layer and found several well-preserved *spherularea sp.*, a common microorganism that formed spherical colonies. It was one of the few macroscopic Martian fossils and thus was highly prized. They wandered two kilometers to a nearby crater and looked at layers there as well.

They hit the road again, stopping at Tiu overlook at 5:30. They headed to the ravine headwall, where they did good geology; they hiked the last half kilometer back to the portahab using flashlights, Phoboslight, and gps. After supper they soaked their feet.

They awoke the next morning at the edge of the central Aram plateau. As they finished breakfast, the domes to Aram hove into view.

“Wow, it’s long!” exclaimed Ethel. “Why didn’t they make a compact square?”

Will shrugged. “They’ve got eight standard 70 by 200 meter cylinder domes, more than even Aurorae, plus a few smaller domes and one new, 300 by 100 meter.”

She whistled. “Pretty big, and for what; 100 people?”

He nodded. “They’ve got space to feed two thousand people and they export food for a thousand, mostly to the Central Highlands. I don’t know how they use the rest.”

The ranger reached the northern end of the double line of domes and turned to drive along them. They looked through the transparent plastic at lush forests, meadows, and fields. Occasionally they caught a glimpse of a pond; the domes ran north-south with the land sloping gradually downward to the south. At the southern end of the line was the new 300 by 100, inflated but still dry and brown.

The ranger turned east again after passing the last dome and headed for Genesis Crater, the heart of Aram. The ranger slowed and Will took over the controls to maneuver against the garage’s transfer tunnel dock, per instructions they received over the radio. They also received an update about the outpost’s air pressure, which was slightly different than they had been told. They waited, ears popping as the portahab’s air pressure climbed slightly, while a suited man outside connected a pressure tunnel to the portahab and tested its safety. A few minutes later Will and Ethel passed through the pressure tunnel and entered the garage.

A delegation of three greeted them. “Good sol, Chief Minister Will!” exclaimed Forest Rivers. “Welcome back to Aram.”

“It’s been a long time, Forest.” Will extended his hand and Forest shook it vigorously. Will was surprised by the man’s totally white beard even though he was in his early fifties.

“It has. Thanks for coming. We’re delighted you could attend the dome dedication.” He turned to Ethel. “Welcome to Aram. We’re honored by your presence.”

“I’m honored to come. I’m very impressed by the domes.”

“They’re pretty extensive, aren’t they? At our current rate, we’ll cover the entire plateau in five centuries. Think what our oasis will be like then!”

“It’d be incredible,” agreed Will.

“Can we provide you hospitality? What do you need?” asked Forest.

“We just ate breakfast, but we’d love a tour,” suggested Will.

Forest immediately nodded. “Yes, we’ll start in Genesis. Do you remember Victor MacLeod and Victorino Alves, my assistants?”

“Yes, of course; we see Victorino all the time.” Will and Ethel shook hands with the two men; Victorino was Aram’s representative in the Mars Council.

They headed across the garage and through a tunnel into Genesis. The 160-meter dome was centered on a 120-meter crater, so they entered high up the crater’s lushly forested and grassy rim and followed a stone sidewalk to a low, wide gap. When they reached it they looked down on a great, circular basin with a vigorous fountain spraying water in the very center. The fountain was surrounded by a circular, manicured park of date palms, citrus trees, and grass, followed by a circle of buildings nestled against crumbling yellow sandstone cliffs.

“Eden,” said Will, causing Forest to smile. He led them down a grand, curved stair to the bottom and gave them a tour of the lodges, the school, the refectory where everyone ate, and the community hall with its statues up front of the “Divine Couple,” Mother Earth and Father Mars, with a pool of water and a tiny fountain in front of them. They shook hands with everyone, which was nearly as exhausting as the walk.

“Do you want to see the domes?” asked Victor.

“Yes, very much,” replied Ethel, intrigued.

“This way,” exclaimed Forest, pleased. He led them out of the community hall, up another curved grand stair, and through a heavy pressure door to the easternmost dome of the oldest pair, which were a mere 30 by 150 meters in dimension. In its fourteen years the ecology had matured; its groves of trees at the northern and southern ends had been pruned back from the dome and the farmland in between was a rich black. Coursing along the western edge of the dome was a rock-bottomed brook two meters wide.

“That’s a lot of water; does it have fish?” asked Ethel.

“Of course. This is the Gihon, one of our two streams,” replied Forest.

“A lot of pumping,” observed Will, but Forest merely shrugged.

He led them northward, dome to dome, along a narrow path hugging the Gihon’s bank. When they reached the northern end of a dome, the Gihon ended in a deep pool; Will could see the water was bubbling up from the depths. It was a simple and clever solution to differential air pressure; if a dome lost pressure, the higher pressure in the next dome would push the water level in its side of the pool down close to the bottom, and the difference in pool levels would keep in the higher pressure even though the river continued flowing through.

They crossed into the next dome through a pressure door three meters wide and high, piercing a wall of concrete, stone, and nickel steel bars two meters thick. The pair of doors was wide open, though they rolled on tracks and could close automatically in less than a minute. Forest stopped and wordlessly demonstrated how easy it was for someone to close a door by hand, but Will was distracted by the strong breeze he could feel even though he could see no fans. A similar door punctured the eastern side of the dome at the ground level, and a third door was open high up at the dome's apex.

The next dome was a freshly-cut wheat field. It was followed by two domes of orchards and vegetable gardens. The final dome, the source of the Gihon, was an enormous paddy from which rice had recently been harvested. The air was surprisingly cool. Crossing to the western set of domes, they walked northward past another harvested rice paddy, then followed the Pishon—the other brook—through forests and meadows.

"Gihon and Pishon; they're biblical streams?" asked Will.

"With the Tigris and Euphrates, they're the rivers watering the Garden of Eden."

"Of course," said Will.

"And the rice paddies are always at the top of the line of domes," noted Ethel.

"Of course. They're the youngest domes, so they're the ones most prone to leakage of air into the ground, and they're at the top of the slope. When we build another pair of domes in the next two years we'll flood them and convert the old paddies into farm and park land."

"And what's the point of the park land?" asked Ethel.

Forest turned to face her. "Land has to have a point?"

She was startled. "It costs a thousand redbacks per square meter to create."

“That depends on how you calculate the costs. But in your terms, yes, the parkland is ‘used.’ It is used by the trees, grass, deer, insects, foxes, mice, owls, and fish. We walk through them and they are our place of meditation and prayer. And when a branch dies, when two trees start to crowd each other, we prune, producing a great pile of what you call ‘plant waste’ which we store for the dust storm season, when we burn it for power and to recycle its nutrients.”

“I was wondering how Aram managed with such a small set of solar power units,” exclaimed Will. He pointed at the open door in front of him. “How do you create such strong air circulation without a fan?”

“Temperature differentials. Trapped solar heat has to be removed from the domes to keep them from overheating, so we remove it from the highest, youngest dome, mostly by pumping it into the ground underneath. That cools the air there and it flows northward and downhill to the oldest domes, where it warms, rises, and flows back through the vents along the dome apex.”

“Impressive,” said Ethel. “How do you handle methane, nitrogen oxides, ozone, and buildup of other rare gasses?”

Forest shook his head. “We don’t; the plants do. You have 100 square meters of nature per person; we have 1,700. The ecosystem is large enough to balance itself.”

“Our domes are separated by thirty to seventy meters, but yours are in contact,” noted Will.

“We don’t have separate domes; we have two long interconnected dome complexes. You have lengthy complexes too, but you run them as separate climates and ecologies so you can’t exchange air among them.”

They continued northward through the western line of domes. When they entered the next to last park dome, they saw a flash of movement; a family of deer dashed through the open door into the next dome. “We’re playing hide and seek with the deer all the time,” Forest said. “We want to establish boar in the forest once we make it bigger.”

“Won’t that be dangerous?” asked Ethel.

“Yes, but Mother Nature isn’t always nice,” Forest replied with a smile.

“And all of these domes have the same climate?” asked Will.

“Yes, an artificial combination that doesn’t quite exist anywhere on earth. Take the climate of northern British Columbia’s Pacific coast or coastal Alaska, take away some of the rain, warm up the winter a bit, and double the length of the seasons—we do one seasonal cycle per annum, rather than the two you do—and you’ve got it. The ecology is from that area, which is well adapted to the relative darkness of the dust storm season if it’s in winter mode.”

They continued through the parkland to the southern end, where Forest led them into the western 150 by 30 meter dome, then through underground work areas and labs into the eastern dome of the same size, then back to Genesis. They headed for the lodging assigned to Will and Ethel, which had a spacious bedroom and a living room with a view of the crater.

“This is lovely workmanship,” said Ethel, running her hand along carved wooden mantle piece above the fireplace in the living room.

“And it wasn’t done by computer,” said Forest. “That’s real oak, not artificial wood with a strip of oak on top for finish.”

“Does the fireplace work?” asked Will.

Forest laughed. “Of course! Burn all the wood you like! The air in Genesis circulates around with the air in all the other domes, so wood smoke is diluted by three million cubic meters of air massing almost a thousand tonnes. The wood ultimately comes out of our biosphere, so burning returns it.”

“I gather your buildings aren’t airtight?” asked Ethel.

Forest shook his head. “Your buildings are, but you’ve never had a dome leak that required them to hold in their air anyway. Even a catastrophic dome failure would still leave plenty of time for evacuation because Genesis is so large.”

“That’s true,” agreed Will. He spotted an electric pot for heating water. “Shall we have some tea or coffee?”

“Excellent idea. Victor can make it.”

“No, allow me.”

“Then we’ll all make it,” said Forest, not to be outdone in hospitality. All five of them trooped over to the corner of the living room to pull out cups and saucers and get the water going. Then they returned to the couch and chairs circling the fireplace.

“I’m very impressed by your facility,” said Will. “I had no idea you had made a place of such beauty. Genesis Crater reminds me of the crater the Zen monastery is in.”

“Yoshi and I had many conversations about landscape design and we learned from each other,” replied Forest. “We probably should set up a little tourist hotel and take in visitors, so more people see the place.”

“That would be an excellent idea,” replied Ethel. “You would get exposure, your ideas would receive circulation, you’d earn some revenue, and you’d provide our people

with a new destination. Everyone wants to take a vacation and all the outposts look pretty much the same; they don't provide a new experience."

"Commercially created environment," agreed Forest. "A focus on function rather than aesthetics. It's not unpleasant, but it could be so much more livable."

"And low-tech," added Victorino. "We manage with a lot fewer air conduits, fans, air scrubbers, and sensors. The Mars Council is very concerned about our future if we're cut off from Earth. Aram is an example of how you could live much more effectively with less imported technology."

"And your people know this truth," added Forest, raisig his voice. "They know that if the area of polder per person were doubled to two hundred square meters, some of the recycling and air scrubbing requirements would decrease considerably."

"It's a balance," agreed Will. "The equipment for recycling and scrubbing air and water costs less than the extra hundred square meters of polder."

"When you can sell platinum-group metals and import the equipment, yes," replied Forest. "When you're cut off from Earth the picture changes." He leaned close to Will. "What do you think will happen on Earth?"

"Do you mean, how will the current crisis be resolved? I think we're seeing a little light at the end of the tunnel. The nuclear exchange is over and society survived the winter. The economy is still contracting and they say it will for another year or so. But there will be some Martian imports launched later this year and some next year. I think fears of being cut off are exaggerated."

"And after that?"

"We'll see."

Forest looked at him intensely and shook his head. “The fears may be misplaced in time, that’s all. I do not see a light at the end of the tunnel, except perhaps the light is the train rushing at humanity that will run it over. Mother Earth is still being raped and she’s losing more blood than she can replace. Forests are being cut unsustainably. Topsoil is washing away; farmland is becoming less productive. Rivers are silting up. Carbon dioxide is pouring into the atmosphere. The patient’s temperature is still going up. Sea level rise has accelerated and the grave consequences have already started to appear. Materialism is driving an unsustainable demand for things, which in turn drives a demand for raw materials and energy. As the Green World Community is demonstrating here, it’s all unnecessary.”

“What future do you envision?”

“A Dark Age. Not a complete collapse of technology or civilization, but far greater chaos and troubles. I would not be surprised if shuttle flights to orbit cease entirely. It’s the hardest link in our transportation system to maintain.” He leaned close. “And for that reason, Chief Minister Will, we badly need your help. The Green World Community has been growing very impressively on Earth, especially since last summer; we’ve gone from five hundred members to ten thousand. And we want to get as many of those people up here as possible.”

“We have a standardized series of passenger screening tests and orientations. In spite of the crisis, there will be at least six caravels and a galleon leaving Earth for Mars in the next five months. Two more are coming from Mars and will fly people back too, if necessary. We hope to fill all of them. Four of the caravels are owned and operated by private companies, so there’s plenty of choice. There are three shuttle services launching

people to low Earth orbit and we're hoping a fourth shuttle will start soon; we've thrown our resources behind them to keep them going. Since the vehicles will be coming here on a minimum-fuel Hohmann trajectory, the cost will average about three million redbacks from the Earth's surface to Aurorae; not bad."

"Very true, and we want to get as many people on the flights as possible, but we have two problems; you've reserved all the berths and we have a cash flow problem."

"The reservations are understandable, isn't it? We have a survival problem. We've thrown more than just money into the equation; we're using our human and financial resources to figure out how to make spare parts and clear bottlenecks. As for the cash flow problem, everyone except us has one. Have you thought of securing a loan against the value of assets?"

"We've hesitated to do that. A lot of our assets are tied up in stock that is worth a fraction of what it was."

"Borrowing against the remaining value is better than selling. You must own gold stock; it's been going up. We can't just give you berths, the flight costs have to be covered. You do have one advantage: no other groups are flying people up this columbiad. The Japanese government suspended its subsidy of New Tokyo and Japanese industry hasn't come up with support. The Mormons, Nigerians, Iranians, Khalistanis, and other religious or ethnic groups have canceled plans to send people. Even the Chinese government has canceled all Mars plans."

"But it's too expensive for us, too."

"Is it? Borrow."

“But how could we borrow against stocks in Marsian companies and get the cash on Earth? Commercial transfer of money and assets between the planets collapsed last fall.”

“The Commonwealth has been using its terrestrial gold reserves as a guarantee in order to transfer money for companies and individuals. We’ve transferred as much as one hundred fifty million redbacks. We’ve had to go into the business because our economy is dependent on cash flows.”

“What about the fact that you hold all the reservations? We have to survive, too!”

He thought a moment. “We don’t have all of the reservations. The Japanese government has twenty or twenty-five berths, the Chinese thirty-five, and I think the Iranian government has six. There are a scattering of other berths held by the mining companies. Some of these are held with deposits. The Ministry of Importation and Immigration has not purchased them because it may not be possible to launch into orbit all the passengers we can fly to Mars. I suggest you make some calls and start buying those seats.”

“How many people will fly to Mars this fall?” asked Victorino.

“We can accommodate up to 1,800, but the limitations on launch capacity require some reconsideration of the safety rules. We’re hoping to get between a thousand and twelve hundred.”

“If thirteen hundred people made it to orbit, you’d fly them?” persisted Victorino.

“If they made it, yes, but if we couldn’t accommodate them they’d never make it to orbit. It’s very complicated. Slow flights save fuel but require more consumables, so if we’re short on consumables we have to fly everyone faster. Consumable supplies are

affected by decisions of Parenago and other lunar facilities to downsize, but that also affects our passenger roster because many of the lunar workers scheduled to return to Earth want to fly to Mars, but only if their astronaut spouse, who is on Earth, can join them. It's a nightmare to figure out the passenger rosters. The launch window normally closes about October 1, but if we extend the window an extra two or three weeks we can fly people on a trajectory into the inner asteroid belt and back to Mars in eleven or twelve months. We've never done that, but maybe we will this time."

"So what do you recommend?" asked Forest, seeking the bottom line.

"Secure your financing first and as fast as possible, get your people through the psychological screenings, be aggressive about getting them on flights, and do anything you can to support the shuttle launches."

"You can't do better than that?"

"Not until you have money and people ready. Talk to everyone with spare berths and talk to all the carriers. How many do you want to fly?"

"One hundred. That'll cost us three hundred million redbacks."

"Three hundred million?" Will nodded. "I don't know that you'll get that many people on the flights, but we can handle the transfers."

"And your people will process and approve the entry permits?"

"If the applicant has jumped through the hurdles, we won't discriminate."

"Okay," he said, satisfied. "I guess that will have to do." He glanced at his watch. "It's 11:20 and the ceremony's at noon. I have to get ready and I assume you will want to freshen up and change. So we should resume this discussion after the ceremony and banquet." He rose. "See you in a little while."

15

Prophets and Presidents

June 2054

Will and Ethel dressed in their best for the ceremony. When they entered the new enclosure, they saw the members of the Green World Community wearing capes or robes over their work clothes, making them look like a bunch of medieval monks and nuns dressed in their best.

They stood at their assigned place in the front row; no one was sitting. The new dome, the size of three football fields, was an immense echo-filled empty space. The ground was dry, dusty, and flat except for a meter high berm surrounding the ceremonial space. He was intrigued that they hadn't flooded the dome. Instead, for months heated and compressed Martian air had leaked downward, warming the reg, then humidity had been introduced to freeze the pores shut. The result was a surface that looked almost pristine—only the rocks and gravel had been removed—but had an airtight ice layer underneath.

A flurry of trumpets announced the beginning of the ceremony. They turned to the door. In came Forest, wearing the red of Father Mars, with Victor and Victorino flanking him, wearing the green of Mother Earth. "He looks a little like Santa Claus," mumbled Ethel. Will smiled and nudged her in the ribs.

The three of them processed slowly to the platform, where they stood facing the crowd. They were followed by the four trumpeters, who flanked the three of them and finished a triumphant and nearly ear-splitting refrain. Forest Rivers raised his hands. "We

thank Father Mars this sol, and we call him to witness this ceremony of re-greening of his surface!" The trumpets blasted a series of notes to echo his point.

He pointed both arms eastward toward an invisible green star. "We thank Mother Earth this sol and call on her to witness this ceremony, transferring her gift of life to this land!" The trumpets punctuated his words again.

He pointed straight overhead. "We thank the sun, bringer of light and warmth, and call on him to bless the greening of this land!" And the trumpets tooted again.

He pointed both arms west. "We call on brother Phobos this sol, and sister Deimos!" He turned to a spot high in the east where a Venus-bright moon was barely visible through the sky's pinkish glow. "And we thank them for witnessing this ceremony of re-greening of the land they lovingly gaze down on!" The trumpets repeated his call.

"My friends! Nature is all around us with water to quench our thirst, air to bring us the breath of life, good ground to feed our plants and animals. Life is a gift from Nature. It is a gift we enjoy and return to Nature when we move on to another world, a gift given back to us when we re-flesh into this one. Let us thank Nature for this gift."

"We thank our nature-mother and nature-father," intoned the audience in reply.

"Friends! Because Nature has given us life, protecting and fostering life is our trust. On Earth we protect the environment, respect it, and strengthen it; we love each other and live simply and communally to devote our resources to life. On Mars we must rescue the native ecosystem, strengthen and protect it, and spread the rich carpet of terrestrial life across the face of a new world, keeping the two systems separate with barriers of plastic, concrete, and ice. Let us pledge ourselves to the service of Nature."

"We pledge to serve our nature-mother and nature-father," replied the audience.

"This sol we bring to fruition another collective gift to Father Mars and Mother Earth, a new and important enclosure, for this place will be our marshland, a rich and productive swamp with fish, water birds, reeds, microorganisms, deer, bushes, mice, foxes, and myriad insects, a source of pure water, peat, oxygen, food, and other natural resources. All of us helped to run the pile drivers and steam injectors, string the kevlar cables, install the multiple layers of plastics to keep in air and keep out ultraviolet and cold, and pour the concrete that knit everything together. The open ground runs as much as fifty meters below us before the pilings are reached, enclosing tens of thousands of tonnes of reg that will become rich soil." He raised his hands high, closed his eyes, and listened for a moment. "Father Mars and Mother Earth speak to us and thank us for this service to Nature." He turned back to the audience. "Now it is time for us to transmit the communion of water and Mother Earth's life to this patch of Father Mars's skin. Come forward! Come forward! Drink and help Father Mars to drink!"

Three young women in white gowns came forward with trays of large plastic cups. They were directed by the three men on the stage to three different faucets set in the enclosure's northern wall and the men followed them. The crowd formed into three lines, one by each faucet. Ethel followed Will to the central line, forming in front of Forest. The woman assisting him constantly filled cup after cup with water and handed them to him. He took the smallest of sips from each and handed it to the nearest person with the words "the water of life." The person then sipped and took the cup across the floor of the enclosure to choose a spot where he or she would pour it.

The line moved quickly and soon Will stood before Forest. He smiled, obviously pleased that the Chief Minister had joined the ceremony. He took a sip and handed Will a cup. “The water of life.”

“Thank you.” Will took it, sipped, and moved out of the way for Ethel to get her cup. Then they walked across the enclosure to a dry spot.

“May this transform,” said Will, pouring it.

“To greening.” Ethel poured hers as well. The water splashed on the sand and silt, then immediately sank into the ground.

They turned to walk back toward the stage with everyone else. Ethel looked at the crowd of Green Worlders, shaking hands or hugging, chatting happily as they returned to the stage area. Then she spotted a young man a few meters away whom she recognized. “Ray! Ray Waters!”

The young man smiled. “President Ethel, how are you! This is my wife, Sharon.”

“Pleased to meet you.” Ethel came over to the young man and his wife with Will trailing behind. She shook hands with both. “My husband.”

“Pleased to meet you,” said Will, and he shook hands with them as well.

“I met Ray at Uzboi three years ago,” said Ethel. “He came to some Bahá'í meetings.”

“Two years ago I joined the movement and last year I came here and married Sharon.” He smiled at his wife, who had a noticeably swollen belly.

“Will this be your first child?” asked Ethel.

He nodded and she smiled.

“What do you think of the ceremony?” said Ethel.

“It was beautiful,” Ray replied. “We took communion from the prophet and made communion with Nature, and the result will be life; a huge area of life.”

“But Father Mars, Mother Earth. . .”

“Think of them as symbols.”

“Just like God,” added Sharon.

“I see,” said Ethel, deciding not to press the matter farther.

“Clear the field!” shouted Forest. “Open the flood gates!”

They looked around. Everyone was hurrying back to the area around the stage, close to the enclosure’s two entrances. They hurried back just in time to see two gates in the northern wall open and water pour forcefully into the enclosure.

“The Gihon and Pishon,” explained Ray. “About ten minutes ago the sluices were opened in the northernmost enclosures and the paddies began to drain. All that water is on its way.”

Will climbed onto the meter-high berm around them. “I hope this is high enough.”

“Definitely; this place is much bigger than the two paddies.” Ray pointed. “Most people are leaving now anyway, the ceremony’s over.”

“And the banquet begins!” added Sharon.

They paused for a minute to watch the rushing water pour in and submerge the flat ground, then they joined the crowd walking back to Genesis. Air vents high up opened and birds flew into the enclosure; life had begun in Eden’s new marshland. The upcoming dust storm season would provide time to establish the ecosystem.

The refectory in Genesis filled quickly as everyone got in the buffet lines to fill their plates. It took Will and Ethel fifteen minutes to walk to the head table because so

many people wanted to chat. They were mostly friendly, though two—including the last one—asked about getting a job at Aurorae. “I guess paradise has its difficulties,” commented Ethel. “I can’t imagine there wouldn’t be problems administering this place.”

“Prophets aren’t always good administrators,” agreed Will. “To his credit, Forest lets them elect a three-member administrative council once per annum. That’s one reason why this place hasn’t collapsed. I’m sure there are people chafing at the restrictions on personal property and on the hard physical labor; I haven’t seen a single robot, have you? I’m not sure how the economics of this commune works; it must lose money.”

“They’ve got a big endowment to cover the deficit. Maybe that explains why they haven’t imported more people over the years.”

They reached the head table, so they had to stop speculating. They sat at their places. Forest proved chatty as he talked about doubling Aram’s population and the construction of two 100 by 300s every annum, instead of one 70 by 200 per annum as they had averaged in the past. Will reminded him of practical matters: sale of agricultural products, firewood, hay, cotton, flax, oilseeds, hemp, fish, wooden furniture, and tourism.

“Yes, yes, we need to be practical in this world,” Forest conceded. “We can be practical in our service to Nature.”

“As this place gets bigger, you’ll have more options. You could even apply for a bioarchive contract.”

“Really? But I suppose we’d have to meet all sorts of standards where ecological monitoring are concerned.”

“Bioarchive is a scientifically based project. But it wouldn’t take many ecologists to meet the standards.”

“Perhaps that’s worth exploring,” considered Forest, though he sounded skeptical. “Could you give some remarks? We’d much appreciate a short talk.”

“I suppose I can offer something.”

“Excellent.”

That distracted Will from further conversation, as he was not one to give a speech without mental preparation. He could feel his attaché vibrating at his belt from incoming messages, but he ignored it and collected his thoughts. Fortunately, Ethel took over the conversational burden and asked her hosts all sorts of questions about their division of labor and the equivalent of a “career” at Aram.

After about half an hour the majority had finished eating. Children were beginning to run around or seek comfort from their parents so they could nap and a few left. Forest nodded to Will. “I’d better introduce you.” He grabbed a cordless microphone stored in a drawer underneath the table and rose. As soon as he stood still for a few seconds the crowd quieted.

“Good afternoon, my friends. We have the privilege this sol to hear from Chief Minister Will Elliott. This is his first visit to Aram in six years and we hope he will not wait that long to return. He is a friend of our community and a sympathizer of many of our ideals. His leadership has created the political environment where our community has been able to grow and thrive, so we are in his debt. For thirty years, in one way or another, Will Elliott has essentially been in charge of this planet and has helped create the conditions whereby its population could grow a thousand fold. He will be remembered in history books as the Father of Mars. Let us greet him.” Forest began to applaud, so everyone followed suit. Will rose and received the microphone from the Prophet.

“Thank you, Forest. I don’t think I’ve ever been introduced quite that way before! Thank you to all of you for your warm greetings, your friendliness, and your hard work. Aram’s dedication to its ideals is truly impressive. You have set a remarkable example for the rest of us to contemplate as we strive to settle this world and spread patches of green across Mars’s surface.

“I have gained several lessons in my few short hours visiting your outpost. First, I have been forcefully reminded of the beauty of nature. You have created a jewel in your design of Genesis Crater and the connected enclosures. Second, I have realized that nature does not exist just to serve human ends. Aram covers one fifth the area of Aurorae, but contains a fortieth of its population. You have *liebensraum,* living space, that we lack or share with large numbers of other people. Indeed, Aurorae is now growing by enclosing large areas cheaply to make low-pressure farmland, creating places where humans cannot function without wearing special suits, thereby cutting them off from contact with nature. Here we are reminded that such an approach forces us to pay a price.

“Third, I have learned that complex technology is not always a requirement to live well. You manage with simpler mechanical systems and fewer computers. This may be a very important lesson for us because our future on this world is clouded by the crisis on Earth. Imports this columbiad may number in the scores or hundreds of tonnes. An economy of less than ten thousand people cannot sustain complex, advanced technology on its own over the long term. We will have to simplify. There will be beneficial consequences, such as an ability to live more cheaply and efficiently on this world. Aram will provide keys that will make such a transition possible.

"Fourth, the 'Marsian way' is alive and well here, and has its own distinctive variant expression in Aram. The Marsian way is a 'third way,' a balance between extremes. It is respectful of cultural and ethnic diversity but does not lack ethical values of its own. It values hard work, service to humanity, fairness and justice for all, honesty, humility, trustworthiness, an educated public, and informed public debate. We see these values well expressed here at Aram, but in a different form from which we can learn.

"Fifth, my visit to Aram has once again taught me about the irrepressible faith of Marsians in progress. We are a society with a sense of destiny. We are not dedicated to the status quo, but to building something new for all of humanity to marvel at. We know Mars has a great future even if we don't know what that future will look like.

"Sixth and last, I saw a glimpse of that Marsian future this sol in the words of my host during the dedication of Aram's new enclosure. He spoke of fostering and protecting two ecologies, the terrestrial and the Martian, of spreading one over the surface in its bubbles of plastic, stone, steel-reinforced concrete, and ice, while the other thrived better and better in the wilds outside. We can bring back the halcyon sols of the Noachian, the 'permanent estival' where Marsian life reached its heyday. In such a world, 'range' and 'polder' will no longer represent opposite extremes of lifeless and verdant, but two different ways for land to be alive. The ecologies will not remain separate. They will penetrate each other. Elysium Outpost has found a few Martian species eking out an existence in the soils of its polders, minding their own business and not disturbing the terrestrial life; similarly, we find a few terrestrial lifeforms surviving in equatorial snows and meltwater. The ecologies reign separately where oxygen and carbon dioxide,

respectively, dominate. As long as this world has both environments, it will have room for both biospheres. This is a prophetic insight I have gained from Forest.

"In conclusion, if I have any advice to offer you, it is to stay the course. Hold to your vision of an oasis of green covering the Aram plateau. Propagate your belief that Earth's environment does not have to be destroyed, but humanity can recognize and assume its role as guardian and trustee of nature. Build your future, confident that in the scheme of things you will play a role in human destiny. Nothing else can assure the Green World Community's place at the table of humanity. You are welcome at that table, and the others around it are watching and learning from you. Thank you."

He handed the microphone back to Forest and sat to warm and enthusiastic applause. Forest rose with a very happy smile on his face.

"Thank you, Chief Minister Will. You have reminded us that this community has accomplished much in the last three decades, has already played an important role, and has a bright future. You have made us feel welcome at the table, have helped to make a place for us, and we will not disappoint you. Once again we are called to the promise that humanity need not destroy itself, but can achieve a mature future, serving as nature's brain while nature serves as our body. Mars has given us a vital variant of that lesson, for we now must serve as the brain, as it were, for *two* natures, terrestrial and Martian. That mandate need not cause terrible conflicts, though it will bring us many challenges. In the next few years Aram plans to construct the first of a series of Martian oases, enclosures where Martian life can thrive, where Father Mars wears his native garb. In this way we will help solve those challenges."

There were a few gasps in the crowd and a lot of talking; Forest obviously had made an important announcement. The crowd began to applaud. “That was great,” said Ethel. “I’m sure they were recording it; it’ll play well everywhere.”

“I tried to make my remarks encouraging but not too supportive of specifics.”

“Like a good politician. You elicited something from Forest, too.”

“I guess so, judging from the audience reaction to his remarks. I doubt the biologists will be pleased when Aram begins to serve as a trustee for Martian life forms.”

“They’ll manage. Say, have you checked your attaché? Mine has been vibrating constantly for the last few minutes.”

“Mine was while I was preparing to talk.” Will reached down and pulled the device from his belt. It was full of urgent messages. “Oh my, something happened.”

“What?”

“I don’t know yet.” Ethel leaned over while he called up a menu of messages from Pete, Huma, Jacaranda, Lal, and Yevgeny. Huma’s had as a subject “Knight, McKay Impeached.” Will pointed. “There, that’s what happened.”

“Not Secretary of State Vanstone! She was the architect of the disastrous China policy.”

“But the impeachment was over incompetence and lies, not the policy itself. The new President will have to decide what to do with her.” Will shook his head. “The United States has kicked out a President and a Vice President for the first time. Incredible.”

“Thank God they did it!” replied Ethel.

Tuessol morning, Will was slightly late for the Cabinet meeting. When he hurried into the meeting room, everyone was there and waiting for him. “Good sol,” he said. “Sorry I’m a minute late. We literally just got back.”

“I thought you left Aram Sunsol night?” said Moses.

“We left Monsol morning so that we could see the scenery just west of Aram, and there were some interesting geological sites on the western edge of the Aram Plateau we wanted to explore. The plateau’s quite a stack of strata! Leaving late also gave us more time to talk to individuals, and they gave us a very comfortable ‘lodge’ to stay in.”

“So, what was it like?” asked Yevgeny, a skeptical smile on his face.

“Quite pleasant. They had a dedication ceremony for their new dome that was a cross between moving and hokey.”

“I liked your speech,” said Jacaranda.

“Thanks. Sunsol morning they gave us a tour of their crafts area, agricultural storage area, and construction facility. Henry, you need to visit. They’re basically a small business in need of advice and maybe loans. With robotization they could turn out a large quantity of very high-quality carved wood items: furniture, moldings, etc. They have incredible craftsmen.”

“Where do they get the wood?”

“They have forests. They should export timber; they could make a killing. Emily, you’ve got to visit, too. Their enclosure has 170,000 square meters; 17 times the space per person we have. The air and water circulates freely through the entire system because they have one climate. They use heat pumps to maintain thermal differentials to make the

air circulate, so they need a minimum of fans, pumps, conduits, and sensors. We can learn some lessons in case we can't import environmental management systems."

"Interesting," said Emily skeptically.

"We need to send an impartial team."

"It sounds like they converted you," Yevgeny admonished.

"No, not at all. They work like dogs because they don't have robots. Five people approached me about living elsewhere; if they left with spouses and kids they'd take ten percent of the community. I doubt most of them will leave, but that tells you that quite a few would like a career, a house, a shopping spree, and an occasional mug of beer."

"They're pretty autocratic organization," noted Huma.

Will nodded. "So, did you give them anything?" asked Yevgeny.

"No, but they want to increase immigration—they expect ecological apocalypse on Earth—and I told them what to do. They want to bring one hundred this columbiad."

"One hundred!" exclaimed Yevgeny. "That makes our situation worse! The number of people who want to fly here increases almost exponentially every month. Three thousand relatives of citizens have applied. The folks on the moon want to bring four hundred spouses and kids with them and they have to be given priority because they're already in space and we don't want to lose them. The requests for positions that different outfits and agencies up here would like to fill—considering they may not have immigration next columbiad—number two thousand. We simply can't fulfill all the requests, nor can we balance them. The moon people are qualified for only a certain range of jobs, mostly construction, mining, and fabrication. Their spouses are usually similar. Their children have no skills, will fill berths, and won't be able to fly back to

Earth soon because of radiation exposure. The relatives mostly offer skills we don't need, like flight attendants and automobile mechanics. We have two thousand people on Earth trained partially or completely to fly here and we aren't even sure how many of them can still come; some may be dead and many have had to move because of economic circumstances, so we've lost track of them. We have a thousand people staying near the various spaceports—some are literally camping out—waiting for flights. And now we want to add a hundred Green Worlders to the mix?" Yevgeny shook his head.

"This will be the least educated, least trained, least skilled cohort to ever arrive," added Henry. "They'll have the least earning potential and the least ability to advance."

"The Green Worlders can pay," noted Will.

"Which is something we don't need," replied Yevgeny. "We've got so much gold income, we can't spend it."

"Look, we know what to do," exclaimed Will. "Yevgeny, you may need our sympathy, but not our advice. I don't care whether they're sitting and waiting for launch, we're not flying children here unless the crew member is absolutely brilliant, the spouse is, or the child is a certifiable genius. It makes sense to tie up one acceleration couch in order to get a second passenger. But it makes no sense to tie up two of them to get a third person when we can use those two seats to fly up two people with skills. As for priority, start with the spouses of the lunar personnel, then fly up the people we've trained to come here whose skills complement those of the lunar staff, then fly up other skilled workers, then fly up relatives with skills of uncertain value last. If people are hanging around and waiting for a flight and don't have skills we need, they get on only if no one else is

available for a particular flight. And as for people arriving here untrained, they'll spending a lot of time en route because of the slow trajectories, so train them then."

"Where do the Green Worlders fit in the priority scheme?" asked Yevgeny.

"The last three categories, but mostly the last two categories. How are supplies, fuel, and spares?"

"Every passenger flight comes up with the requisite dehydrated food, we're flying frozen food to Earth starting next week, and cryogenics should be plenty for slow flights because the moon's production facilities have no competing demands and its shuttles have adequate spare parts. The main complication is the fact that the United States has not suspended hostilities."

"But they're not going to attack us," responded Moses.

"Probably not; but there's the shortage of shuttle spare parts and other restrictions," replied Yevgeny.

"How's the L1 warning system?" asked Will.

"Mikhail Shtokman says the radar can detect incoming objects about two hours before arrival; that's barely adequate. They've got a crew working on it."

There came a knock on the door. One of Huma's assistants stuck her head in. "Excuse me, but we've just heard that the President of the United States will be sending a video message for the Chief Minister in four minutes and seeks the favor of an immediate response."

" 'The favor of an immediate response'?" asked Yevgeny.

"We'll find out," replied Will. "I need to get up to speed on this one. I saw Knight's bitter speech and McKay's breakdown into tears over his impeachment. Driving

home yestersol and last night I caught up on the news; Aram is in a time warp, no one there pays any attention to terrestrial events! But I haven't heard Pete's report."

"He was told diplomatic relations would resume," said Huma. "Our diplomatic personnel are preparing to fly to Washington. Ruhullah has started to receive calls from NASA personnel. But there's nothing definite, even about suspension of hostilities."

Will's attaché rang. Will pulled it out; it was a video transmission from the White House. He linked it to a video screen on the wall, then pushed play.

The seal of the President of the United States appeared momentarily, then it dissolved as President Bartolomeo Mennea's face appeared. Will studied it closely. He had seen it several times in the last sol and wondered whether it looked familiar.

"Good day, Chief Minister Elliott," began Mennea. "As you know, forty-eight hours ago I was thrust into the presidency of these United States under most unusual circumstances, having become Speaker of the House of Representatives a mere six weeks ago, a position that is constitutionally second in the line of presidential succession. Since then I have been occupied by a thousand pressing items, but that in no way reflects on my priorities for space flight or for Mars.

"It is our desire to resume normal diplomatic relations with Mars immediately and to recognize your Minister of External Affairs and your Ambassador at large. It is my hope that Minister Theodoulos can come to the White House for a meeting in the next week. I have ordered all hostilities suspended immediately.

"Longer term, we would like to see the United States and Mars resume their historic pattern of mutual cooperation and support. The events of the last ten months have gravely wounded that relationship and the United States has paid a very high price. But

we have every reason to be friends. The U.S. has traditionally been the leader in the exploration of space, but Mars's role has expanded rapidly. Our two nations have no geopolitical rivalries; our relationship should be more like that of the U.S. and Britain or Britain and Australia, partners with a common culture and language. It is my hope that we can resume such a relationship.

"I should add, Mr. Chief Minister, that I have admired your personal qualities and leadership ability all the way back to our days together at Brown. I greatly respect leaders of integrity and vision who can listen to and communicate with their people. You have a well-deserved reputation for these skills. I plan to be centrally involved in American space policy. I shall be sure to find time to meet with your External Affairs Minister.

"Please let us know whether you will recognize either of the previous American ambassadors, even though both of them ended their diplomatic responsibilities under unusual circumstances. Alternately, it may be possible to fly a new ambassador to Mars in the next few months. Goodbye."

The transmission ended and several Cabinet members cheered. "Wow, the President called *us*!" exclaimed Huma. "That's quite a concession!"

"But he flattered a lot too; not a good sign," added Moses, shaking his head.

" 'Our days together at Brown'; does he know you?" asked Yevgeny.

Will frowned and thought, then nodded. "*Bart.* That's who he is. I do remember him vaguely. He and I were on an interfaith organization at Brown University; I was the Bahá'í representative and he was one of the Catholic reps. He's from an Italian-American family from Federal Hill, the old Italian-American neighborhood in Providence, Rhode Island. I was chair of the committee to plan an interfaith Thanksgiving event and I think

he was on it. . . yes, he drove me in his car to his old neighborhood to buy some of bread and pastries for the event. That's right, I remember it now. He had a volkswagen beetle and we had quite an energetic conversation, but I don't remember about what!"

"He remembers you," said Simin. "Which make sense, because about fifteen years later you became famous."

"He was planning to enter business," agreed Will. "So I didn't hear about him."

"Let's not let this old friendship cloud the relationship," warned Yevgeny.

"No, let's build on it," replied Will. "Bart was a friendly guy and a man of principle; I remember that. I gather that's one trait he still has, because in the last six weeks the various references to him in the media have all been that he's 'squeaky clean' and 'honest.' Those were reasons he was selected. He's also bald, which is one reason I didn't recognize him!"

"You should ask him for launch support," said Yevgeny.

"Yes, definitely. At least we now have a cessation of hostilities. That changes a lot of our plans."

"It frees us to pursue a wider range of options," agreed Yevgeny.

Will rose and walked to a videophone sitting on a table against the wall. He sat in front of it and typed in his personal password, then accessed his incoming messages. He jotted down talking points on an electronic page while the cabinet members looked over his shoulders and offered their thoughts. Finally, he was ready. He hit "record reply."

"Good day, Mr. President. My cabinet and I were delighted to receive your message and hasten to send our cordial congratulations and best wishes to you upon your assumption of the office of President. You have been thrust into possibly the most

difficult job in the world in one of the most difficult times in history. Everything we have heard about your abilities and qualities suggest that you are well prepared personally for your new responsibilities.

"We are extremely pleased that you are resuming diplomatic relations and have called a formal halt to hostilities. We never initiated hostilities against you and have nothing to halt. We also never broke off diplomatic relations with you and thus are pleased to resume all contacts. Minister Theodoulos will be happy to come to Washington at a convenient time. We will recognize either former Ambassador Manning or former Ambassador Stark but would recommend that you credential a new ambassador who has training specifically in diplomacy and space policy. Neither of the previous ambassadors could serve as a conduit to NASA or your space policy organs.

"We also welcome the reestablishment of a partnership with the U.S. We have long felt like a cultural child of America, just as America is a cultural child of Britain. It is natural for our strongest foreign relationship to be with the U.S., but since Marsian independence it has not been. We can still rectify the problems that led to the estrangement between our nations. The best way to demonstrate a resumption of normal relations and build back toward partnership would be the resumption of American support for orbital shuttle flights launching our personnel and cargo. This could take several forms: provision of badly needed spare parts for shuttles flying out of French Guiana, Brazil, Australia, Okinawa, and Nairobi; access to the same flights for personnel of American citizenship; the launch of shuttles from American spaceports to the Ibis Hotel, which is serving as our transportation hub; and security guarantees for Chinese

shuttles flying to Ibis. We will also want to open discussions about our mutual responsibilities in the jovian system, which urgently needs resupply.

"We hope to hear from you about these forms of cooperation. In spite of everything, our concern for the conditions of the people in the U.S. has remained strong, as we demonstrated by our humanitarian relief in the fall and our effort to facilitate financial transfers all winter and spring. And on a personal note, I am delighted to reestablish contact with an old associate from Brown. I remember our lively discussion one November morning almost fifty years ago as we made thanksgiving purchases together. I remember your concern about building bridges with people of other faiths and your listening ear. I look forward to new conversations with you."

16

Launch Window

Early October 2069

Mike Tobin turned away from the window as his jetwing approached Aurorae's runway at 800 kilometers per hour. The beginning of the runway sudden shot past the window in a blur a mere fifteen meters below the aircraft and simultaneously the retrorockets came on, firing forward and downward at the same time. He grabbed the arm rest instinctively as the sharp deceleration pushed him deeply into his rear-facing seat. *One terrestrial gee.* He reminded himself that what he was feeling was the pull of his birth world; it made him feel leaden. But the rocket burst lasted only fifteen seconds. It was followed by a bump as the slowed aircraft, moving at a mere 250 kilometers per hour, touched down on the runway. Then the brakes came on and they slowed more gradually.

They stopped near a conestoga, which rolled over and extended a pressure sleeve against the jetwing's door. A suited attendant made sure the sleeve was locked in place. In a few minutes it was pressurized and they all transferred to the vehicle. Ten minutes later they entered Arrival Hall, where Liz Elliott Tobin awaited her husband.

"Mike!" she shouted when he came out of the door, even though he was only five meters away. She was surprised by the urgency and excitement in her voice. She missed him. Five months of nightly videophone calls, punctuated by only two brief visits; it had not been enough.

"Liz!" He raised his voice as well and trotted over, carrying his loaded suitcase like it was a feather. She drank in his muscular figure, strengthened by four months of

hard construction work outside, while he surveyed her shape, which was honed by her hours of daily dance practice.

He dropped his suitcase and lifted her into the air with one arm, hugging and kissing her and sweeping her off her feet all at once. She threw her arms around him as well. “Welcome home!” she said, a foxy tone dominating her voice.

“Thanks. I’ve missed you.” He kissed her again, then lowered her to the floor.

“Wow, your muscles; you’ve never been in such good shape!” She felt his upper arm admiringly.

“Moving steel and welding it every sol in a pressure suit.” He shrugged. “At least I had quiet evenings to finish the dissertation. I’d rather have been with you.”

“And thesis defense next week; wow!”

He laughed his little laugh. “Yeah. And look at you, more beautiful than ever.”

She giggled. “You’ll love the new dance routine we’re performing at the Martech Theatre next Satursol. This time I have three really good dancers accompanying me, and the Mariner Chamber Orchestra composed a special piece.”

“I can’t wait.” He looked at her. “Let’s go to the Dacha. Or the Marriott.”

“We can go home. Dad’s at the office and will be on his way to Cassini in two hours on the same jetwing that flew you here. Mom decided it would be a good time to go to Uzboi for a few sols.”

Mike smiled. “Kind and discrete of her. But I’d still like to have some special time with you, so let’s make a reservation somewhere for tomorrow night, or sometime.”

“Okay.” Liz glanced at the collection of golf cart-sized buggies parked by the door to South Main Tunnel. Mike saw her look and began to move toward them, arm

around her waist. They stepped into the first free one, put his suitcase in the back, and Mike swiped his credit card. “Andalus please.”

The buggy said “Andalus it is” in a pleasant and friendly female voice and began to move toward door, which was open because other passengers had climbed onto other buggies. It turned left and began to accelerate. “Wow; no more long walks.”

“You can’t always get a buggy when you want one,” said Liz. “How was the flight?”

“Routine. We had to fly over the category-four dust storm enveloping just about everything between Cassini and here. The ground was completely hidden. But we were above the dust and the ride was smooth.”

“That’s the route dad takes this afternoon.”

“Don’t worry, it’s fine.” He smiled at her. “No more Cassini!”

“Thank God! Five months. I hope you get that position at Martech.”

“I think I will. Of course, I’ve got to pass.”

“Of course you’ll pass! It’s a revolutionary and ground-breaking theory!”

“That’s my line. We’ll see what the committee says. So far the emails have been positive.”

“I’m sure.” She cuddled against him. “You’ll finally be Dr. Tobin. A good time to make a lot of changes in our lives.”

“Our own house and our own family. Any news from Marshall and Amy?”

“She’s sitting at home, walking as little as possible, and waiting. The baby’s overdue by two sols.”

“Last picture I saw, she looked like she was ready to pop.”

“Yeah, she’s big! Marshall calls her ‘the cow’ and she hits him.”

Mike laughed. “I’ll remember not to do that.”

“You better not!”

“Let’s start looking for a house tomorrow, okay? It’ll take my mind off this thesis defense. I really don’t want to live in your parents’ place any more. I have no specific complaint, they’ve been great, but I want a place of our own.”

“I agree. It’s time.”

“Exactly. It’s time. There should be plenty of choices, and since your dad said he’d guarantee the mortgage, we know there won’t be a problem getting a loan.”

“That problem’s getting better anyway, and there are a lot of places; I’ve been looking at the real estate ads in *Mars This Sol.* I have some ideas.”

“Good! So have I. Prices aren’t bad.”

“I noticed. Are they done with the cryogenic tanks at Cassini?”

He nodded. “Thank God! Two methane tanks and three oxygen tanks, twenty meters in diameter and twenty meters high, able to store 20,000 tonnes of liquid oxygen or 5,000 tonnes of liquid methane, behemoths able to keep Cassini powered up during a category five dust storm at full power for three months. Considering we’re about to get a long-term lease over the Chinese reactor, it strikes me as a boondoggle.”

“A lot of people are saying that now; Aurorae and Uzboi have seven tanks and Dawes has five. But all these places have to be prepared for reactor maintenance or an accident. It’s cheaper than a pipeline or a superconducting power line.”

“And how. A lot of my work buddies are staying on to build a new 300 by 100 and housing in it to double the population of the place.”

“It’s too bad we’re decentralizing. I love Aurorae and hate to see these other places competing. But we need to export gold and we need a more even distribution of population in case any one outpost has a big emergency.”

“I’m not sure I buy that. Aurorae’s so big, no disaster could affect it end to end.”

The buggy slowed and turned into Andalus Square’s underground unloading area. Mike glanced at the fare; six redbacks. “Not bad.”

“The price is really good, especially for two.”

“Have a nice sol,” exclaimed the buggy to them as they climbed off. Mike grabbed his suitcase and they headed up the ramp to Andalus.

They had to blink from the bright sunlight as they came above ground. It was noontime and the square was full of people eating and shopping during their lunch hour. “It’s good to be back.” He glanced at the far end of the long building forming the southern side of the square. “I see the American embassy is cleaned off.”

“Yes, not long after your weekend visit a team washed all the red paint off. They’re open for business again. A new ambassador’s coming next year.”

“I heard about that; Manning’s just Chargé d’Affairs.” They walked past the European Union embassy, the Chinese embassy, then the American embassy; they all had sections of the same long building. The Indian Embassy, in contrast, was on the third floor of the Gallerie. Just as they were passing the American embassy and making a right turn in front of the Commonwealth Building to head home, they passed Dr. Nathan Rubin, Martech’s resident philosopher and ethicist. “Hey, Mike, I thought you were at Cassini!”

“I was there for five months, but I’m back now.”

“Great! Construction or science?”

“Science! I’m tired of construction.”

“He defends his dissertation next week,” added Liz.

“Excellent! Best wishes! We’ve got a great Ethics Forum coming up in three weeks: ‘The Ethical Basis of Loving Relationships.’ We expect a big audience.”

“I bet! That’s a great topic.”

“Yeah, and we’ve got the religious communities coming to speak about their often old-fashioned views. Should be a lively debate!” Rubin chuckled.

“I guess so! We’ll see, Nathan.”

“Ciao, and welcome back.”

“Ciao.” They waved and continued up the alley. “He tries to hard to compete with the religious communities,” complained Mike.

“Lately he’s been choosing topics that the secular support and the religious don’t. But even so, he’s contributing to the discussion.”

“I guess. I’ll tell you what I think is a basis of loving relationships.”

“What?”He smiled. “Great sex.”

She nodded. “Yes, that’s a big one, isn’t it!” And they headed on up the alley toward the tunnel leading them to the house’s front door.

Will Elliott and Huma Mubarak arrived at the meeting room at the Cassini Hilton at exactly 3 p.m., as scheduled. Ambassador Zhao Tao and his assistant were walking up the hallway at exactly the same moment. “Good sol,” said Tao.

“Good sol,” replied Will. “I see the hotel staff has prepared green tea.”

“Excellent, let us relax and enjoy it.” Tao and his assistant entered the room and the four of them took cups and took turns assisting each other. “That was a very dignified ceremony,” continued Tao. “It made turning over the reactor to Mars almost painless.”

“We wanted to minimize the pain. We have no desire to embarrass China, especially now.” Will alluded to Tibet’s formal declaration of independence and the likelihood that President Wong would be forced from office over it.

“We appreciate that. We can understand the pain caused by loss of territory. But at least in this case we still retain technical sovereignty, and you maintain practical control. It’s a good compromise.”

“It was quite a shock for Margen. But they’re acquiring an excellent team. Mr. Ambassador, have you inquired about the Chinese shuttle fleet?”

“I have made a call to our Foreign Ministry, but there’s little I can do.”

“I understand, but Mr. Ambassador, we have about 75 potential personnel who have trained and are in China. That doesn’t include the 40 or 50 who have left the country surreptitiously and are awaiting transport in Australia and Kenya. It is in China’s interests—and your interests—to have more Chinese up here. Our Chinese citizens have made marvelous and important contributions to Mars. A single shuttle launch from Hainan Island to Ibis could transport as many as fifty Chinese personnel. It’d be a good test of the repairs to the spaceport and would be an international good will gesture.”

“The American could shoot at the launch and the French could seize the shuttle. I know your very skilled diplomatic personnel have been working on those problems. . . but Mr. Chief Minister, do you *really* want so many people here?”

“People are our best resource for self sufficiency. Growth is Mars’s safety net.”

"Possibly true. Look, Chief Minister Will, it is no secret to say that our shuttles have only so many launches left before they run out of replacement parts. The manufacturing chain of everything is disrupted; for that matter, the agricultural production and distribution chains are still broken, and obviously they get priority over manufacturing shuttle parts. We have to replace a hundred satellites and we can't even get them up. And you want us to launch *your* people to Mars?" He shook his head.

"We're making exactly the same request of the U.S., and they have agreed to a launch, plus two launches of cargo for Callisto."

"They had six commercial spaceports in the U.S. We only had two. And they're launching their ambassador."

"And fifty-four of our people."

"Fifty-four? They're stuffing extra people into the cabin? Interesting. The United States had over a dozen commercial owned shuttles before the war. A much larger number than our commercial and government-owned fleets. It's much easier for them to swap parts and keep one or two flying than it is for us.

"And how much is this spacelift costing you? I hear your government's paying triple—a million redbacks per passenger—for commercial launch of your personnel. And you're drawing down the world's total supply of spare shuttle parts. You'll get twelve hundred or thirteen hundred people to Mars, but then the Earth won't have any launch capacity to send up Marsian imports, or anything else for that matter."

"Mr. Ambassador, the Earth had twenty-five shuttles before the war. Their combined lift capacity was enormous; ten thousand tonnes to low earth orbit before the parts ran out. At spaceports all around the world, frequently replaced parts are being

taken off, inspected, and sometimes cleaned or repaired. The repair potential has only begun to be explored. Shuttles don't mothball well; ten thousand tonnes of launch capacity will evaporate over time whether they are used or not. So we'd prefer to use them while we can. And we're not going away; we can guarantee demand for thirty launches per year, of personnel one year and cargo the next. That will encourage innovation. The Earth may run low on launch capacity for a few years, but I don't think it will run out. The economy will have to get much, much worse before that happens."

"And if it gets worse, the value of gold will increase and your buying power may go up even more. I see your strategy. Are going to get any cargo launched?"

"We've identified two hundred tonnes of emergency imports: vaccines, computer chips, turbines, manufacturing equipment. They'll be on the caravels and the galleon. Beyond that, we hope to launch another eight hundred to a thousand tonnes early next year that will arrive on solar sailers over fifteen or sixteen months."

"That's impressive, if you can do it. But it'll be hard without American and Chinese shuttles, and it'll be hard to get them. A million redbacks per passenger won't be enough to acquire the Chinese shuttles because the manufacturing and launch infrastructure needs billions in repairs, not mere millions."

"With the huge financial shortfalls and the dropping price of labor, fifty million redbacks can go a long way. How's this additional incentive, then? Let's say we throw in free transportation from Earth orbit to the Martian surface for cargo for the Chinese facility here; one tonne for every passenger launched by Chinese shuttles. It can be anything legal. If you want to import Chinese beer, that's fine. Get fifty personnel into low Earth orbit for us and we'll give you free transport for fifty tonnes of cargo. You can

re-sell commercial items; that'll make money for your facility and help our stores. Or if you can arrange pressure suits, computers, and other essentials, go for it."

"That's a possibility. It would help us out here, and the Chinese government is worried about us."

"It would help us, too. We have solar sailers accumulating at L1 and we'll have to send them back to Mars empty pretty soon, or they won't be available to transport next year's gold back to Earth. But the people must be launched by the end of this month. The launch window closes November 1. Cargo launches need to occur before March 31; after that the solar sailers can't make the trip in a year."

Tao nodded. "I understand. I'll bring this new offer to the Ministry. That may get you something; twenty people and twenty tonnes of cargo, for example."

"Anything, Mr. Ambassador."

"I understand. Very well, I will ask."

Marshall did not sleep well. He was worrying about Amy; she was now a week overdue. And she kept kicking him as she slept fitfully next to him.

Then she shook him. "Marshall, wake up! I think this is it!"

"What? Really?" He sat up in bed and looked at her.

"Yes!" She looked worried, but certain. He glanced at the clock; 5:45 a.m. He cast a glance out the open door of the bedroom and saw twilight spreading into the living room from the court beyond.

He bounded from bed quickly and pulled on his clothes while she dressed slowly. She paused for a contraction. "Every fifteen minutes," she said, glancing at her watch.

He pointed to the package of items to take. “Anything else?”

“Just call sick bay.”

He nodded and had his attaché put the call through and let the doctor on duty know they were on their way. Fortunately they didn’t have to walk far.

She was now dressed. They walked out the front door and onto the balcony. It was a lovely, cool morning. The growth lights, scattered about the court’s space, were beginning to glower; the court’s song birds were waking up and beginning to sing; and the cool dawn air was perfumed by the smells of overnight flowers. It was the time of day when one really couldn’t tell one was inside a spaceship hurtling through space at one hundred thousand kilometers per hour, five hundred million kilometers from both Jupiter and Saturn.

They tiptoed past the open windows of some of their neighbors as they walked across the balconies to the bridge and then to the other side of the court. They took the elevator down one floor to the rim level, where a corridor led them to court 4. They crossed it as well and continued to court 3. On the opposite side of it, fronting on a patch of sloping lawn with flowers and date palms, was the hospital. The doctor and nurse were ready. That gave Marshall a moment to catch his breath and call Mars.

It was the late morning of October 6, 2069, on Mars, and Will was meeting with his “Immigration Cabinet,” Yevgeny, Emily, and Henry, in his office. “I’m glad you tried that one tonne of cargo for one-passenger idea,” said Yevgeny.

“It intrigued Tao,” agreed Will. “Thanks for suggesting it. The cessation of hostilities with the United States should help, too.”

“Any feedback from Pete yet?” asked Yevgeny.

"No. His shuttling between Beijing and Washington has helped. The wording gets President Mennea the peace he needs without making President Wong look weak."

"An apology would have helped," complained Emily.

"That still may happen; the United States might even pay reparations indirectly. But they won't shoot down Chinese shuttles and no one will seize space assets."

"That's what we need," said Yevgeny. "Both sides now can fly to Ibis Station. A peaceful first flight establishes their willingness to treat it as neutral ground."

"Pete's stressing that."

"What will this do to our passenger roster? The launch window's open," asked Emily.

"We've got 1,100 passengers ready for trans-Mars injection or on their way up," replied Will. "The galleon's leaving last with up to six hundred. We can delay its departure as late as November 15; the moon's making plenty of fuel for a fast trajectory."

"Will, if we have peace for the next five weeks, we could acquire as many as six hundred more!" said Yevgeny.

"Good! Let them come! *We need people*, Yevgeny."

"But Will, how will we accommodate 1,700? We don't have housing for them. They'll arrive between March 15 and June 30. Our shuttles can't land them that fast."

"Sure they can, and we *can* accommodate that many. We'll have to build some cheap, compact dormitories. And a lot of those extras are relatives of people already here who can accommodate them temporarily."

Yevgeny looked shocked, but Emily nodded. “There are some nuclear engineers in the extended list; we need them. And some rocket engine specialists who can help us make engines from scratch. And fuel cell manufacturing experts.”

“Watch out what you wish for,” said Yevgeny. “All three of those areas are important, but require money, support staff, and equipment as well as experts. Most of those people know how to make things based on the availability of very expensive machinery that we won’t make here until we have a million people.”

“Yevgeny, with peace we’ll be able to import the cargo we need.”

“Remember all those people will have to devote their first year here will to construction, not to rocket engineering,” reminded Yevgeny. “That’ll be a shock for them and a huge training problem for us. We’ve had up to 1,200 people arrive here in previous columbiads, but they were spread out over twice as many months and their arrival was facilitated by several thousand tonnes of cargo. These people will arrive to bare cupboards. It won’t be easy, and the more arrivals we get, the messier it’ll be.”

“I concede your point, Yevgeny, and I repeat: *bring them on.* We need them. All of us will survive a bit of chaos.”

“It won’t do your popularity up here much good.”

“I’m not Chief Minister to be popular!” Will snapped back. “I’m Chief Minister to develop Mars.”

“An unpopular Chief Minister can’t get much done. Don’t say I didn’t warn you.”

“Fine. I want as many people flown up as possible; those are my orders. If we have 1,700, we’ll have four months to get ready for them. Thank you.”

"Thank you," replied Yevgeny and Emily. They collected their stuff and headed for the door. "I'll get started on an analysis of impacts," promised Emily as she left.

Will nodded. He considered what Yevgeny said. His old friend was right; their capacity to absorb migrants was weakened by the lack of *stuff.* And the lack really had just begun to hit them. Solar sailers had left Earth as recently as twelve months ago with cargo; the last ones were just arriving. Typically, the peak months for launching cargo to Mars started eight months before opposition and ran through three months after it. They had lost the entire seven months before opposition and wouldn't be receiving any cargo until the fall of 2070. They had to accommodate the largest number of arrivals in Marsian history without any new supplies from Earth.

It was a formula for potential disaster.

His attaché beeped. He looked over; it was a message from Marshall. Excited, he pushed play. "Hi dad and mom. Amy's getting contractions every fifteen minutes, so we just walked to sick bay. The baby's on the way. We'll call later. Ciao."

He stared at the screen, excited and numb. He wished they were on Mars now rather than flying to a cold, distant, and dangerous place. Then he rose and headed out of the office. "Huma, cancel my appointments," he shouted. "I'll be working from home most of the sol. Marshall and Amy are having their baby."

The labor was not quick or easy. Amy soon descended into a world of primitive feelings and urges, of groans and involuntary contractions that had to be voluntarily helped, of painful stretching of tissues and aching muscles, of breathing and pushing. Marshall encouraged, massaged, tried to help, and found himself praying spontaneously a lot.

Things intensified in the evening, and an hour before midnight their son was finally born. Within five minutes, Marshall called home with a portable camera in the birthing suite. “He’s a beautiful little boy!” Marshall exclaimed. “He’s really white, but I guess skin color changes some after birth, so it’s too soon to say how much melanin he’ll have. He has a little bit of curly black hair, like you, dad, and he has Amy’s blue eyes. He’s so small, I can’t believe it! But he masses 3.2 kilos, which is pretty good. He’s got a loud cry; I couldn’t believe it when he cried! He’s breathing really well and they’ve cleaned him up good. Here, take a look.” Marshall turned the attaché’s camera toward Amy, who was holding the baby and smiling wanly. She turned the baby, who was now asleep, so they could see his face on Mars.

“The name,” she whispered to her husband.

“Oh, yeah, that’s right. We want to name him William, dad. William Taraz; I was so impressed by uncle Taraz and his premature death disturbed me so much, especially since he died saving my life, so I asked Amy and she agreed to it. William Taraz Elliott. A little boy on his way to Saturn. It blows my mind to think about it. I have a son, out in the middle of deep space.”

“Life goes on,” whispered Amy.

“Yes, life goes on,” agreed Marshall.

17

Vignettes

mid Nov. to early Dec. 2069

The house was brightly lit, attractive, new-smelling, but small. Liz wandered down the stairs and couldn't help but note that whereas her parents' house consisted of two twenty by ten meter cylinders, the one she and Mike were considering consisted of half a cylinder at most, was assuming you counted half of the central garden. The ground floor was eight meters long and ten meters wide. The front half of the space was a living room opening on the garden; the rear half was divided roughly into two halves, the kitchen and dining alcove respectively, with a stair between them. A tiny bathroom occupied the space under the stairs; the stairs faced a tiny airlock in the back wall, which provided emergency egress into the house in the next cylinder. The top floor was eight meters long and six wide, with a master bedroom over most of the living room and two smaller bedrooms over the rear half of the house. The second story also had a full bathroom, a narrow balcony overlooking the garden, and lots of storage closets along the sides under the sloping top of the cylinder. Except for a skylight over the top of the stairs, the rear of the upstairs had no sources of natural light; the house was buried under three meters of regolith.

A garden ten meters wide and four meters long separated them from another house occupying the other half of the hemicylinder; that house was only nine meters wide because of a one-meter access way to the garden from the main tunnel. The garden was planted in grass and received sunshine through a large skylight over it.

"How many hours of sunlight does the garden get?" she asked, curious.

“Seven or eight,” replied Simeon Afigbo, the builder. “We lose two hours in the morning to Cathay’s reflectors, and two hours in the afternoon to Punjab’s. But once the sun gets high enough so we’re out of the shadow of either dome, it comes in strongly.”

“It’s a shame there are no skylights in the rear bedrooms,” observed Mike.

“There are, but they’re filled with sandbags. We can remove the ceiling cover and take the bags out, if you want. Most people want those bedrooms for children and they don’t want the kids exposed to radiation.”

“Can you make even a small skylight? If it was just thirty or forty centimeters across it’d let in a lot of light, but not much radiation.”

“Sure, that’s easy. Just make sure no beds are under them.”

“I’d rather have at least some light.” He looked at Liz. “What do you think?”

“I like the living room. It’ll be nice for entertaining.”

“It’s big enough for a dozen people. And I know you like to entertain; you’ve got your parents’ habits.”

“Well, it’s a Bahá'í habit; to some extent it’s a Marsian habit,” she replied.

“I wish we had a permanent office, but I suppose we can use one of the bedrooms, and then maybe part of the dining room.”

“Some people divide off a part of the living room,” suggested Simeon. “Making it seven or eight by four instead of ten by four. We can add a wall pretty easily if you want.”

“Maybe later,” said Liz. “Do you do further painting?”

“If you want, but most people paint the walls themselves after purchase.”

She glanced at the light gray rug covering the living room floor; it was not the color she preferred, but it was alright. She liked the yellow tiles of the kitchen floor and its cabinets and storage closets in light brown simulated wood. Kitchens on Mars tended to be small and serve as storage areas, since people ate out most of the time.

"How much is it again?" asked Mike.

"Two million." Simeon said it without flinching; this was the reality of housing on Mars. "You've got mortgage approval already, right?"

"Yes, and we have a big down payment. The two of us had a condo here that we sold before going to Mercury for two years where we saved a lot, then I got a construction assignment in Cassini and saved more. It took four months to get our savings transferred to Mars, but we now have it."

"These are bad times, financially."

"Two million strikes me as rather high," continued Mike. "I'd rather pay 1.75 million, frankly. There are a lot of older places on the market."

"You've seen more places than I, then. I'm afraid the price really isn't negotiable, especially with 1,700 people on the way. No one expected more than 1,100 and there was no labor available to build extra housing. Now there will be a shortage." He paused, then added, "I suppose we can throw in some repainting, though."

"That's good," agreed Mike, wishing he could push the price down more. Between 600,000 in savings and a gift of 400,000 from Will and Ethel, they'd have a substantial deposit, but a million redback mortgage on a combined income of 750,000 would be difficult.

“One of the selling points of the duplex model is privacy,” continued Simeon. “Other than the neighbor across the garden, you have the space to yourselves. We’re building more and more condos in the bigger bubbles, either in twenty by forties or thirty-five by seventy-fives, and there are a lot of units in those enclosures.”

“Do you plan to do more landscaping?” asked Liz.

“No. Usually the two households treat the garden as common space and make a mutual arrangement about its landscaping. You should plant some roses; your father loves them.”

“He does,” agreed Liz, with a smile.

“The other unit hasn’t sold yet, but will within a month, I think,” continued Simeon. “Demand is going up. I have quite a few buyers emailing from their staterooms between the planets. If you know anyone looking for work, my cousin could use a dozen people to buy and move furniture into new houses.”

“We’re employed,” replied Mike.

“He just got hired by Martech’s Department of Geophysics,” added Liz.

“Congratulations,” said Simeon. “I take it the degree is finished, then.”

“Yes, I’m finally Dr. Mike.” He looked at Liz. “What do you think?”

“When can we move in?” she replied. It was an ordinary house for someone who had been on Mars five years; she knew several people who owned the same model. But she liked it and the location was pretty good.

Simeon smiled. “The paperwork takes an hour.”

“Then let’s sign,” she said.

They moved in a week later. Liz and Mike both took some sols off from work to scour the outpost for furniture, used or new; fortunately they found some new models made in Aram that were attractive, though rather expensive, and that matched some of the wooden antiques Will and Ethel had given them after they got married. Will took a sol off—a rare thing—to buy rose bushes and other landscaping items, which he and Liz planted in one part of the garden and in pots on the balcony. The painters came and spray-painted the walls according to Liz's instructions while Mike set up the kitchen. In seven sols they owned a house ready to live in.

The first evening they had Will and Ethel over for dinner. Mike cooked his celebrated vegetarian lasagna. Marshall and Amy "attended" by videomail from a distance of eighty-two light-minutes, which reduced them to one long, smiling message at the beginning of dinner and a goodbye at the end. Willie, now six weeks old, was looking stronger and bigger.

Will and Ethel left at 9:30 p.m. They crossed the garden, walked down the accessway, and entered the Cathay-Punjab Central tunnel. In a few steps they were in Cathay. "A cute place," said Will.

"Three times as big as their starter flat in Columbia," added Ethel.

"Yes, much nicer. But I think they should have bargained with Simeon more aggressively. Two million! They could have talked him down ten percent."

"Mike said he said there was a housing shortage."

"There's a housing rush and a panic, but not a real shortage. Everyone's saying "oh my God, we're getting seven hundred extra arrivals.' The plan originally was for 1,800, not 1,700. The crisis made 1,800 impossible. Both Dawes and Cassini had to

expand under emergency circumstances because of the evacuation of Uzboi. Most of those people are back at Uzboi, but the new housing at Cassini and Dawes is fit for dormitory accommodation, and we'll be doubling the size of both of those outposts because of the high gold prices. So it's really not serious. Do you realize there are about two hundred fifty 'second homes' on Mars, like our little flat in Uzboi? That's enough for about half of the extra arrivals. And some are relatives of citizens, a hundred are heading for Aram. . . our unexpected population growth spurt is less than ten percent of our total, and we have a lot of surplus accommodation."

"Maybe in theory, but not necessarily in practice. Practice is always messier!"

They were walking along Cathay's River Walk, enjoying the water, the little pocket gardens, the Chinese architecture, and all the signs in Chinese, with English in small print underneath. Will pointed left to a road that crossed the riverwalk: the route to the Cathay-Andalus northwest tunnel. "Let's walk through Andalus on our way home." Ethel nodded and they turned left.

Andalus was on the other side of a seventy-meter tunnel, off of which were a dozen buried housing bubbles like the one in which Mike and Liz lived. One tended not to notice their recessed entrances unless one went into them on a regular basis, but more and more residents were moving into private, commercially constructed enclosures. They exited the tunnel into a short alley between the Gallerie and the Commonwealth Building.

That took them past a very popular café, the Moorish Tea House, whose tables overflowed over the cobblestones of the square. One table near the walkway had a familiar group: Brian Stark, Roger Anderson, Madhu Gupta-Anderson, Érico Lopes, and Carmen Segovia. They spotted Will and Ethel and waved.

“Hey, stop for tea!” said Roger.

“No room at the table,” replied Will.

“Nah, there’s always room.”

“Let’s,” agreed Ethel. Will nodded and they walked into the café to buy hot tea and a few little cookies. By the time they returned to the table it had two more chairs.

“We’re celebrating,” said Roger. He patted Brian on the back.

“The pardon. Yes, I’ve been meaning to congratulate you.” Will offered his hand and he and Brian shook.

“I didn’t hear,” exclaimed Ethel.

“President Mennea pardoned five former ambassadors who were accused of various actions that opposed government policies, including me,” Brian explained.

“The previous administration played hardball on everything,” said Ethel. “Congratulations, Brian. Now what? I suppose your government pension’s not worth much in redbacks.”

“No one can live here on it! I think it’s been raised to $2.5 million per year, but with the dollar down to a twenty-fifth its former worth it equals 100,000 redbacks! But that’s not a worry any more because two hours after the pardon was issued I got a video call from Skip Carson offering me a job!”

“That’s our other reason for celebrating,” said Érico.

“He wants to make two movies up here and he wants me to manage them.”

“Really?” said Will, pleased.

"He wants to make the first seven billion dollar spectacle; of course, that's not much with inflation! Hollywood's rolling in dough right now because everyone's feeling so miserable they're watching movies. He wants to spend 300 million redbacks."

"What does he want to make?" asked Will.

"The first one's called the 'Cinnamon Revolution' and predictably it's a fictionalized version of our independence struggle. I get to play the American representative on Mars! Skip says if I do well I can have a bigger part in 'Hellas,' a tale of interpersonal conflict and cabin fever in a fictional Marsian station during the winter."

"There's a lot of material for that!" exclaimed Roger.

"That's for sure. The public is very interested in Mars; he thinks the two scripts can do well. And March through July's a great time to shoot the first film because of all the arrivals; we need a lot of extras! We may travel to Hellas to shoot on location, too; southern Hellas will be in fall and early winter."

"You'll help relieve unemployment, too," noted Ethel. "We'll probably have more arrival chaos than usual. I've been overseeing the hiring of 150 new crew at Uzboi and it's been confusing."

"It *has* been," agreed Roger. "I've been hiring for expedition support. Some people are well qualified, but are considering three different jobs. Others want exploration but lack experience. They're coming because their cousin or sister is here."

"It's going to be crazy for a while," agreed Will.

"We've got a lot of underemployed," quipped Érico. "The geophysics department can't do much. I was talking to Alexandra Lescov the other sol and she's idled, too."

“Galleon production is cut way back because there are no customers and we aren’t doing any design upgrades,” agreed Will. “But she just agreed to be Chief Executive Officer of Margen. It’s expanding and needs an experienced administrator.”

“That’s good,” said Érico. “Any hope of getting more reactors?”

“Margen will run the Jumla reactor when it comes on line in a few months,” replied Will. “The Chinese will own it and most of the personnel will be Chinese, but they’ll be working for Margen. The only one outside our control will be on the Chinese nuclear reservation at Dawes. I don’t think we’ll gain control over it soon.”

“They’re not a threat anyway,” said Brian. “I sense a real resentment among the Marsian population about these compromises of sovereignty, though.”

“Yes, the people want to control all of Mars,” agreed Will. “But independence is always illusory. That’s what the mess on Earth is all about.”

“Brian, what do you think the mood of the people is?” asked Ethel, curious.

“Stoic; they’re bearing up. The worst of the crisis on Earth is over; no one plans to nuke anyone and the crazy shortages of last winter are not likely this winter, though finances will still be horrible for millions of people. But our own difficulties are just starting. The last cargo sailer that left Earth before the crisis arrived last month and seventeen hundred migrants are on their way. The year 2070 will be interesting.”

The others nodded in agreement.

Marshall was startled awake by the approaching footsteps. He looked up; it was Amy walking down the balcony toward him. He had fallen asleep in the comfortable chair on their balcony, Willie in his arms.

“How are you?”

“Good. Did you put him to sleep, or did he put you asleep?”

“Yes. Both. I’m getting a lot of sleep at odd times.”

“Babies do that, don’t they? I wish you wouldn’t put him to sleep out here, though; too much ultraviolet.”

“Not that much; just enough for the bees to navigate by.”

“The doctors say it’s too much for newborns.”

“This’ll help; look.” He carefully put a hand behind Willie’s head and tipped him backward so they could see his sleeping face. “Look at the color. In this light you can see the melanin.”

Amy looked closely. “Yes, you’re right, he’s a person of color, though barely.”

“Hey! It’s important to me!”

“I know. I’m sorry. You’re one quarter African and Willie’s an eighth. But let’s not expose him to u.v., melanin or not. He’s getting zapped by too much cosmic radiation as it is.”

Marshall rose and followed Amy inside. “How was work?”

“The usual. I wish we knew whether we were going to Titan, Enceladus, or Rhea; we can’t plan ahead at all.”

“Geology’s in a tizzy over that, too. We may vote and inform Yuri of our decision! Have you heard anything from Martech?”

“No, I’d better bug them again about rescheduling my dissertation defense. I really don’t want it to drag out past our arrival, everything will get too busy.”

"I agree." Marshall had completed his dissertation defense six months ago and now had his doctorate, but Amy's had been delayed by the pregnancy.

They heard a soft ring tone indicating an arriving video message from one of Marshall's family. Marshall looked around for the nearest viewing device. "Incoming video message from Mars; please project it on the wall screen," he said. A moment later the screen flickered and Liz and Mike's faces appeared. From the background, he and Amy could see that they were in their new living room.

"Hi Marshall and Amy!" began Liz. "I wanted to let you know right away. . . I just came back from Mariner Hospital . . . I'm going to have a baby! Or maybe I should say two, since I was taking Geminale! They're due about July 1, seven and a half months from now! We're *very* excited, we're going to call Mike's parents next to let them know, then we'll call mom and dad and arrange to have dinner with them tonight; I can't tell them by phone! How did you handle all the thoughts that rushed through you when you heard? My God, this is complicated . . . we've had a pretty busy few months, between Mike's return, his completion of his doctorate, our buying a house . . . I guess I'll have to cut back on my dance career for a while!"

"We're really excited!" added Mike. "It's a strange feeling to think we're going to have a family. . . what a miracle! . . I guess it's an expression of optimism in the future of humanity, eh? Things look pretty bad in some ways, but at least here on Mars we're doing alright." He looked at Liz and smiled affectionately.

"We'd better make this a short message," she continued. "I can't give any other news because anything else sounds trivial. I remember your message when you

announced the news, and now Willie's so cute. We're looking forward to having our babies too. Bye." The picture froze, then faded.

"Great!" said Amy. "They must have just heard, they're still reacting to it!"

Marshall laughed. "They are! How do you handle the complicated thoughts. . . they don't know how much more complicated it feels when you're on board a ship!"

"That's true. At least they're in a safe, low-radiation environment. But they're having two; I'm glad we didn't have to deal with that." Amy looked at her sleeping son, then reached down and took him from Marshall. He awoke, looked at mom, then went back to sleep. Marshall watched and smiled.

"Mom and dad will be thrilled. I think mom wants to go into semi-retirement anyway. This may prompt her to do it."

"Your mom, retired? She's not seventy yet. Of course, they've got enough money to retire when they want."

"The problem is that they don't want to retire."

"Do you think your dad will accept re-election?"

Marshall considered, then nodded. "Yes, he'll want four more years. A couple of grandkids won't change that. But I bet this election season will be rougher than ever."

Ramesh cast a glance at the chronometer in the lower corner of one of his electronic pages. It was now 7:05 p.m. He was late. He didn't jump up from his desk; he wanted to see his kids, but he didn't mind making Sarah wait a bit, now that she was his ex-wife. Besides, his work had been almost overwhelming for months, and he loved it. First Marbuild had less housing to complete than expected; then it had a series of emergency

construction projects to augment all the outposts's cryogenic storage capacities; then it had a super-emergency to provide housing for half the population of Uzboi and hundreds of residents of Aurorae at the other outposts; then it had a short-term emergency to convert temporary housing into permanent accommodation for the unexpectedly large influx of immigrants and a sudden change of the master plan, which required the construction of one additional low-pressure 300 by 300 and one additional full-atmosphere 100 by 300 at both Cassini and Dawes. From sol to sol, demand fluctuated wildly for nickel steel rebar, pilings, sheets, and structural members, for kevlar, mylar, straight-chain polyethylene, and nomex to make plastic enclosures, for sheet rock to build walls, for concrete, duricrete, glass, and fiberglass, for airlocks, tunnels, air conduits, water and gas pipes, copper wire, and for a rapidly dwindling supply of imported sensors, microcell communications relays, computers, screens, optical fiber, electric motors, fans, and a zillion other essentials. Ramesh was constantly overseeing the movement of personnel from one outpost to another and from one job to another. It had been huge, complex, high-pressure, exacting, and stressful; in short, he had thrived on the troubles.

But it was enough for that sol. He deactivated the various electronic pages on his desk and the figures and words on them all disappeared into the blank white background. He had a very small communicator hitched to his belt that he could connect to any stray piece of electronic paper nearby and could whisper to him via the ear piece semipermanently resting in his right ear; with it his entire office was available in seconds. So he checked the transport schedule and made a reservation in four minutes for a buggy heading for Punjab, where he was supposed to pick up the kids for the night.

The sun was slanting across Cochabamba Dome as he left Marbuild's headquarters. He headed for Cochabamba's transport station, where one boarded pressurized robotic busses heading for New Hanford or the Escarpment, or robotic buggies able to move eight at a time westward along the North Main Tunnel. Thanks to his insistent lobbying a few years ago, the tunnel was two-way the length of the outpost. When he arrived he found the buggy waiting. It made two stops before Punjab and dropped him off underground four minutes later; much faster than walking.

He took the ramp above ground and emerged fifty meters south of Punjab Square; a short walk. As he entered the square Siddharth Swaminathan, the temple priest, was eating dinner in front of the temple and waved to him. He was dining with Lal Shankaraman, and usually whomever he was eating with was performing the meritorious act of buying the priest supper. The priest was often outside the temple; he tended to see more people there than inside.

The Taj Mahal restaurant was on an adjoining side of the square with tables on the cobblestones. It was packed, as usual, with an equal mix of Indians and non-Indians. Ramesh spotted Sarah and the three kids, but he was startled to note that she was eating with Rajan Yagneswaran, an artificial intelligence specialist at Martech. He could see they were flirting, which caused him to flush with anger. Rajan was younger than she, but he was also a Christian and had faculty status.

He started forward, but caught himself. She was no longer his wife; he couldn't control her love life; he was trying to manage his temper and his anger about life; and his guru was present, not to mention many other members of the Indian community. He gulped, took a deep breath to control himself, and even closed his eyes for a moment to

focus on his breathing and slow it down. Studying yoga with Swaminathan gave some physical benefits, as well as a mental detachment he had never found inside himself before. He opened his eyes and walked toward the table.

"Daddy! Daddy!" exclaimed Rajiv, the big boy who was almost seven, and his cry was immediately echoed by the four year old twins Hridaynath and Jayanti, who left the table and ran over to him. He picked up Jayanti and hugged and kissed her, followed by her two brothers, then walked slowly to the table with them. The food had been delivered and he had to control his anger at that; Sarah could have waited. Now he couldn't leave with the kids, nor was he comfortable sitting with them.

Sarah looked a bit guilty, but he couldn't tell whether it was because of the food or the presence of her boyfriend. "We couldn't wait any longer. The kids were hungry."

"That's okay." He turned to the man at the table and nodded. "Evening, Rajan."

"Good sol, Ramesh. How are you managing with the workload?"

"Reasonably well. I've got some pretty clever electronic assistance, not to mention three excellent aides. How are you doing?"

"Pretty well. We've been working on some very interesting applications, lately."

"Excellent."

"You want to join us? Or sit at another table while the kids finish?" asked Sarah.

That was a sticky question. Ramesh hesitated. "Let's see, I could sit—"

"Ramesh! Ramesh!" Siddharth was approaching him and apparently had seen the problem. "Good evening! Come eat supper with me!" He pointed to an empty table nearby. "Over here!"

"Thank you, you're kind."

“Dad, can I eat with you too?” asked Rajiv.

“Fine with me,” exclaimed Siddharth.

“Come over if your mother agrees,” said Ramesh. He walked to the table. There he added, “Thank you for saving me, but I don’t want to interrupt your supper.”

“No, don’t worry, Lal and I have been drinking tea for the last half hour anyway.” Siddharth leaned close. “You were magnificent. Calm, collected, reasonable, all in an awkward situation.”

“Thank you, it was difficult.” He sat opposite Siddarth. Rajiv was on his way over with his plate of food, so he had only a few more seconds of privacy. “I guess you can teach an old dog new tricks.”

“Indeed you can. It is never too late.”

EM 17 Dec 2054 (Nov. 30, 2069)
Earth 5/15/69 Mars 11/15/70
Earth 8/1/69 Mars 2/1/70
Earth 9/15/69 Mars 12/15/69
Earth 11/1/69 Mars 4/1/70
Earth 12/1/69 Mars 5/1/70

Vernal Equinox March 24, 2053 (Feb. 15, 2068)
Summer Solstice: Sept. 1, 2068
Autumnal Equinox, April 9, 2054 (Mar. 3, 2069)
Dust storm season starts, June 9, 2054 (May 3, 2069)
Winter Solstice: July 28, 2069
Dust storm season ends, late November 2054 (late Oct. 2069)
Vernal Equinox, Feb. 9, 2055 (Jan. 2, 2070)
Summer Solstice: July 20, 2070

Flights:
Venus 1 leaves Mars for Venus Feb. 2053
Venus 1 flies by Venus late Sept. 2053
Venus 2 leaves Earth for Mars late Oct. 2053
Venus 1 reaches Earth Feb. 2054
Venus 2 passes Venus early March 2054
C17M1 departs Mars, 1 June 2054
C17E departs Earth, 4 June 2054
C17M2 departs Mars, 22 June 2054
C17G departs Mars, 1 Aug. 2054 (2.5 month flight)
Venus 2 reaches Mars Sept. 2054
C17E reaches Mars, 2 Oct. 2054
C17M1 reaches Earth, 1 Sept. 2054
C17M2 reaches Earth, 1 Oct. 2054
C17E departs Mars, 2 Dec. 2054
C17M1 departs Earth, 1 Oct. 2054
C17G reaches Earth, 15 Oct. 2054
C17M2 departs Earth, 1 Nov. 2054
Venus 2 leaves Mars for Venus Nov. 12, 2054
C17G departs Earth, 15 Nov. 2054 (6 week voyage)
Opposition, 17 Dec. 2054
C17G returns to Mars 31 Dec. 2054
C17E returns to Earth, 15 Feb. 2055
C17M2 returns to Mars, 1 May 2055 (6 month flight)
C17M1 returns to Mars, 1 June 2055 (8 month flight)
Venus 2 flies by Venus Earthbound mid June 2055
C17E2 departs Mars 13 May 2055

Mercury 1 leaves Earth for Mercury, 17 Aug. 2055
Venus 2 reaches Earth from Mars Oct. 2055
C17E2 passes Mercury, 2 Nov. 2055
Mercury 1 reaches Mercury, 17 Nov. 2055
C17E2 reaches Earth, 23 Jan. 2056
Mercury 1 reaches Mars 27 Apr. 2056

Titan 1 leaves Mars, 29 June 2053/68
Titan 1 flies past Jupiter +8.5 months = March 15, 2054/69
Titan 1 reaches Saturn +22 months = April 29, 2055/70

PLOT DETAILS:

US/China tension builds, July-Sept. 2053

US says Taiwan should be independent, July 2053
Taiwan makes a move toward independence, July 2053
Mars has a fire

Security Council deadlocked, Aug-Sept. 2053

US/China war, Oct 2053-Jan. 2054

US demands Mars stop exporting to China; occupies Gateway to block Chinese transportation to moon, block Mars imports; seizes assets in USA (Oct.)
US embargos Mars (Oct.); Mars refuses to back down
US turns off power exports; Mars revokes reservation treaty
China threatens to turn off power; Mars threatens not to send resupply to Jupiter; China continues to send power. Silane is shipped overland from Dawes and beamed from Cassini

Grand Union embargos USA and China (Nov.) but doesn't help Mars much

US stock market crashes, Dec. 2053

Sarah divorces Ramesh, Jan. 2054
European stock markets crash, early Jan. 2054
US institutes draft; cities riot, population is furious

China backs down and population riots; Tibet, Shinjang revolt (Feb-May)
Grand Union embargo of China ends, Feb. 2054

First Marsian suicide; immigration plans complicated; longer work week necessary; money shortages;
Exports to Mars blocked during prime solar sailer season (Mar-June)
Mercury 1 reaches Mars 8 March 2054

Marshall and Amy announce their pregnancy, Mar. 2054
Titan 1 flies past Jupiter +8.5 months = March 15, 2054
World depression declared, Mar. 2054. Price of oil falls because demand crashes.
Platinum prices drop; gold prices soar

Conversation with Manning in May; he and family are staying on Mars
Worldwide chaos, May 2054; economy predicted to contract 50%
Bahá'í population on Earth begins a major expansion
Will's electric razor breaks, can't buy another one, has to use Mike's

U.S. Embargo on Mars ends, June
Grand Union embargo of USA ends, July 2054

Amy's baby born, Oct. 6, 2054
Liz and Mike find a house; prices are going up; Mike starts new job
Pres. Mennea calls Will to thank Mars for its diplomatic effort; they exchange small talk as well; embargos on Earth are coming to an end.
Liz and Mike announce in December they're expecting in July
Dust storm season ends, late November 2054
Glance at new baby. Conflict between Helmut and Charles on Ceres? Religious conflicts on Mars? Will tapes his weekly Fireside Chat? Visit New Hanford to view plans for smaller portable 10 mw, 30-tonne nukes for outposts? Or 10-mw, 50-tonne heavy-water natural uranium reactors?

Titan 1 flies past Jupiter +8.5 months = March 15, 2054

Autumnal Equinox, April 9, 2054
Dust storm season starts, June 9, 2054, and it's a bad one

Amy's baby born, Oct. 6, 2054

Vernal Equinox, Feb. 9, 2055
Mars elections, late Feb. 2055
Will reelected to second term, March 2055
Liz and Mike have baby, July 4, 2055

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